Supplement to American Journal of Public Health
Vol. 26, No. 3, March, 1936

AMERICAN PUBLIC HEALTH ASSOCIATION YEAR BOOK

1935-1936

sociation Committees
Committee Reports
Schools of Public Health

State, City and Full-Time County Health
Officers of the United States

SUPPLEMENT TO AMERICAN JOURNAL OF PUBLIC HEALTH
VOL. 26, NO. 3, MARCH, 1936

Sixth Annual Year Book

AMERICAN PUBLIC HEALTH ASSOCIATION

1935-1936

AMERICAN PUBLIC HEALTH ASSOCIATION
50 WEST 50TH STREET, NEW YORK, N. Y.

CONTENTS

Foreword to Sixth Annual Year Book

WHEN the first *Year Book* of the American Public Health Association was presented to the membership in 1931, it was a device calculated to accomplish two purposes; first, prompt publication of scientific committee reports read at the Annual Meeting under one cover rather than in scattered installments throughout the year; and second, to release the two hundred odd pages of the *Journal* previously given over to committee reports for the admission of timely contributed articles having no Annual Meeting origin.

A considerable volume of material representing cumulative and current information relating to the Association which the *Journal* had carried heretofore seemed more appropriate for publication in the *Year Book*, and was accordingly included—such things as the Constitution and By-laws, lists of committees, and section councils, the report of the Executive Board to the Governing Council, etc.

This pattern was followed without alteration for 5 years, while a picture was forming in the minds of the Editorial Committee of what the *Year Book* could be in order to render its best service to the membership. There finally evolved a conception of the *Year Book* as a depository of the things mentioned above and also of certain information significant to health workers and classified as—unobtainable elsewhere, accessible elsewhere from sources not generally familiar, or perhaps easily available but worth repeating for constant and ready reference. Obviously, to include all would be to attempt to bind the Surgeon-General's Library in one volume. We can begin modestly, however, to add to the *Year Book's* usefulness, and this year it is presented with several new sections.

The lists of state, county, and city health officers are included, with indications of American Public Health Association membership affiliations. Other innovations are: a list of universities in the United States and Canada conferring public health degrees, together with brief statements of entrance requirements; a list of American foundations making grants of amounts in excess of $5,000 for medical and public health purposes in 1934; a list of cities surveyed by the American Public Health Association; lists of winning and honorable mention cities and counties in the Rural and City Health Conservation Contests.

The only omission over previous years is the report of the Executive Board to the Governing Council. This is a lengthy mimeographed document which has been distributed in full to the members of the Council. It covers in detail the work of the administrative office and of the five standing committees. Its permanent value outside the Association's archives is questioned, and it is, therefore, omitted from the 1935–1936 *Year Book*. Copies are available in the headquarters office and will be sent upon request to anyone interested.

Suggestions from the membership are invited for future *Year Book* improvements. They will be considered for inclusion in later volumes providing they have value for a fair segment of the total membership.

The American Public Health Association

Its Objectives and a Pledge of their Attainment

OUR permanent objective is the effective control of preventable disease, and the security of health for all the people.

The first necessity to attain this objective is:

A full-time health service with trained personnel for every community, and provision of adequate public funds for its support.

The first fruits of such organization and support of public health knowledge and resources will be:

1. Reduction of the maternal mortality rates, so that the United States and Canada will be second to no nation in the safety of motherhood.
2. Securing normal growth of body and mind for children, and their training in the laws and personal practices of a healthy life.
3. Protection of life and limb and promotion of health for the working man and woman.
4. An adequate supply of safe milk for every community.
5. An adequate supply of pure water for every community.
6. Elimination of tuberculosis, malaria, hookworm disease, typhoid fever, diphtheria and smallpox, among the communicable diseases of which we have sufficient knowledge.

The American Public Health Association pledges to the health workers of the country and to the people of our member nations vigorous coöperation in carrying these projects to a successful conclusion.

CONSTITUTION AND BY-LAWS
AMERICAN PUBLIC HEALTH ASSOCIATION

As Adopted at the Fifty-eighth Annual Meeting, and Amended at the Sixty-fourth Annual Meeting

CONSTITUTION

ARTICLE I Name

The name of this Association, incorporated under the laws of Massachusetts, is the American Public Health Association.

ARTICLE II Object

The object of this Association is to protect and promote public and personal health.

ARTICLE III Governing Council

A. *Composition:* There shall be a Governing Council consisting of:

1. The officers of the Association.

2. Thirty members of the Council, to be elected by and from the Fellowship of the Association, for three-year terms, one-third retiring each year. These members of the Council shall be nominated and elected as provided for in the By-laws.

If one of these members is elected a Section Chairman, Vice-Chairman, or Secretary, or appointed the representative of an Affiliated Society, a new Councilor to fill such vacancy shall be elected by the Governing Council.

3. The Chairman, Vice-Chairman, and Secretary of each Section.

4. Representatives to be appointed by Affiliated Societies as provided for in the By-laws. Such representatives shall be Fellows of the American Public Health Association.

5. The elective members of the Council of the Health Officers Section.

6. A representative to be designated by each regional branch. Such representative shall be a Fellow of the American Public Health Association.

B. *Terms:* Terms of Councilors shall begin at the end of the annual meeting when elected, and shall terminate at the end of the annual meeting at expiration of term; provided that Councilors shall have the right to attend meetings of the Council in an advisory capacity as soon as elected.

C. *Reëlection:* After two consecutive terms, an elective Councilor shall be ineligible for reelection to the Council during one Association year.

D. *The Officers of the Association* shall be the officers of the Council.

E. *Functions:* The functions of the Council shall be:

1. To establish policies for the Association and for the guidance of the Executive Board and the officers.

2. To establish Sections of the Association; to combine or discontinue them when necessary; to maintain coördination among them; and to formulate general rules governing the policies of the Sections.

3. To submit to the vote of the Association all resolutions which have received the approval of the Governing Council.

4. To elect and establish qualifications for Affiliated Societies, Fellows, and Honorary Fellows as provided in the By-laws.

5. To elect the Executive Board and the officers of the Association.

6. To receive from the Executive Board at its first session, at the time and place of the annual meeting of the Association, a definitely formulated statement of a program of the major activities proposed for the ensuing year. To determine at the annual meeting of the Association in general outline the allocation of Association moneys in the budget for the ensuing year. To require a report from the Chairman of the Executive Board in which the work, the accomplishments and the financial status of the Association during the year preceding such annual meeting shall be reviewed.

7. To publish after each of its meetings an abstract of the minutes of such meetings.

F. *A Quorum* of the Council shall consist of ten Councilors.

G. *Meetings* of the Council shall be called by the Executive Secretary at the request of the President, or at the request in writing of any twelve Councilors. In the latter case, the call to meeting, issued at least twenty days in advance, shall state the purpose of the meeting.

ARTICLE IV Officers

The officers of this Association shall be a President, a President-elect, three Vice-Presidents, an Executive Secretary, a Treasurer, and the Chairman of the Executive Board. The officers, with the exception of the Chairman of the Executive Board and the Executive Secre-

tary, shall be elected by written ballot of the Governing Council as provided in this article and in the By-laws. The President-elect shall serve as such from the close of the annual meeting at which he was elected to the close of the next annual meeting, when he shall automatically become President. As President he shall serve to the close of the next succeeding annual meeting. Other officers shall serve from the close of the annual meeting when elected, until the close of the next annual meeting, and all officers shall serve in any case until their successors are elected and qualified. A majority vote of the Councilors voting shall be required to elect, and if no candidate receives a majority vote on the first ballot, the candidate receiving the smallest number of votes shall be dropped after each ballot in succession until a majority vote is obtained. The Chairman of the Executive Board and the Executive Secretary shall be elected by the Executive Board, which Board shall define the duties and authority of these officers, respectively.

ARTICLE V AMENDMENTS

This Constitution may be amended by a two-thirds vote of the Fellows of the Association present and voting at an annual meeting, provided that the specific amendment to be acted upon is published in the official publication of the Association not less than thirty days prior to the meeting, and provided further that the amendment has received the approval of the Governing Council.

BY-LAWS

ARTICLE I MEMBERSHIP AND DUES

A. There shall be seven classes of constituents. Of these, Fellows may be elected only from the United States, Canada, Mexico and Cuba. The other six classes of constituents may be elected from any country. The respective appellations, qualifications for election, and dues shall be as follows.

1. *Fellows:* Only professional health workers, from the United States and its possessions, Canada, Mexico and Cuba, who have been Members of the Association for at least two years, and of established professional standing (whether employed by public or private agencies or in independent private practice), shall be eligible for election as Fellows, provided that a Member shall be not less than thirty years old at the time the application for Fellowship is made, and provided, further, that the following persons shall be considered to have an established standing in the profession of public health, namely:

a. A person who has attained the degree of Doctor of Public Health, Doctor of Science in Public Health, Doctor of Philosophy in Public Health, or other equivalent degree, according to standards approved by the Executive Board of the American Public Health Association.

b. A person who has attained an academic or professional degree involving training in public health, and who has been regularly engaged in public health work for four years, having rendered meritorious service in the public health profession, either as a health officer or in responsible charge of work in a state or municipal department of health or other official public health organization.

c. A person who has done notable original work in public health or preventive medicine of a character to give him a recognized standing equivalent to that required for Fellows under paragraphs "a" and "b."

d. A person regularly engaged in public health work for at least five years, who has given evidence of special proficiency in the service of an official or unofficial public health organization, and who has attained a professional standing equivalent to that required for Fellows under paragraphs "a" and "b."

e. A teacher of public health or one of its constituent sciences. As such he shall have attained distinction as an expounder of the principles of public health or its constituent sciences and he shall have had at least five years' experience as a teacher of public health subjects. Any years of experience as defined in paragraphs "b" and "d" that the applicant may have had shall be considered the equivalent of the same number of years experience as a "teacher."

f. A person not covered by the above, who has made substantial contributions to public health work in his chosen branch of public health service, and who has attained a professional standing equivalent to that required for Fellows under paragraphs "a" and "b."

The application for Fellowship shall be made on an approved form and shall be sponsored by two Fellows of the Association who shall be Fellows of the Section with which affiliation is desired, provided, however, that when affiliation with a Section is not desired, the sponsors may be any two Fellows in good standing in the Association. Fellows without Section affiliation shall be known as unaffiliated Fellows.

When the application has been duly sponsored and otherwise completed, it shall be transmitted to the Administrative Office of the Association, which shall make note thereon of such knowledge as it may have concerning the standing of the applicant in the Association. The application shall be forwarded by the Administrative Office to the Secretary of the Section in which affiliation is desired, for the approval of the Section Council, and when acted upon by the Section Council, it shall be returned to the Administrative Office by the Secretary of the Section, after he has made endorsement on the application of the action of the Section Council. When the application is for unaffiliated Fellowship, the Executive Board of the Association shall act in place of the Section Council. When the application has been approved by a majority of the Section Council or the Executive Board, as above provided, it shall be voted upon by the Governing Council, provided the name of the applicant shall have been officially published at least fifteen days in advance, and provided further that the application shall have been approved by the Committee on Fellowship and Membership

A Fellow may belong to and vote in only one Section, but such affiliation may be transferred to another Section if approved by vote of a majority of the Council of the latter Section. Unaffiliated Fellows may become affiliated with a Section if approved by vote of a majority of the Council of the Section with which affiliation is desired.

The right to hold office or to serve as chairman of a committee in the Association shall be limited to the Fellows of the Association, whether Section Fellows or unaffiliated Fellows. The right to hold office or to serve as chairman of a committee in a Section shall, however, be limited to the respective Fellows in such Section. This provision shall not prevent the election of a Vice-President of the Association who may not be a Fellow.

The dues of Fellows shall be $10.00 per year.

2. *Honorary Fellows:* Honorary Fellows may be elected by the Governing Council for distinguished service in public health. Honorary Fellowship shall not include voting power or payment of dues.

3. *Members:* Persons professionally engaged or interested in public health work shall be eligible for election as Members when sponsored by two Fellows of the Association. They may serve on committees, except as chairmen. Dues $5.00 per year. A Member may belong to only one Section, but such affiliation may be transferred to another Section if approved by vote of a majority of the Council of the latter Section. Unaffiliated Members may become affiliated with a Section if approved by vote of a majority of the Council of the Section with which affiliation is desired.

4. *Sustaining Members:* Individuals or corporations interested in public health may be elected to Sustaining Membership. Dues $50.00 or more per year.

5. *Affiliated Societies:* A state or provincial public health association or similar regional society including more or less than a state, primarily composed of professional public health workers and organized for the same general objects as the American Public Health Association, may be elected as an Affiliated Society, provided that not less than twenty of its active members and at least one-half of its active members are Members or Fellows of the American Public Health Association. Not more than one such society shall be admitted from the same area.

A society applying for affiliation shall submit a copy of its constitution and by-laws, its last annual budget, a roster of its members and such other evidences of its qualifications as may be required. It shall submit annually and at other times such reports on its financial standing, membership and other matters as may be required by the Executive Board of the American Public Health Association.

The Committee on Fellowship and Membershall shall consider all applications for affiliation and report its recommendations to the Governing Council.

The annual dues of Affiliated Societies shall be one per cent of their gross annual income, the minimum dues per society being $10.00 per year.

Each Fellow, Member, and Affiliated Member of the American Public Health Association shall be a member of the Affiliated Society to which he is eligible and no person eligible for election to an Affiliated Society shall be admitted to Membership, or Affiliated Membership in the American Public Health Association unless such person has qualified or at the same time qualifies as a member of an Affiliated Society.

For every Fellow, Member, or Affiliated Member paying annual dues to the American Public Health Association, the American Public Health Association shall remit to the Affiliated Society of which such person is a member the sum of $1.00 per annum.

6. *Affiliated Members:* This class of membership shall include all active (namely professional) members of Affiliated Societies, and in areas where no Affiliated Societies exist such other professional sanitarians as may be elected to this grade. Dues $1.00 per year.

7. *Life Members:* Upon the recommenda-

tion of the Committee on Fellowship and Membership any individual member of the Association may be elected a member for life. Election to this grade shall not affect the privileges held by such individual in his previous grade of membership. The dues for Life Members shall be $100.00, payable within one year after election, and this payment by such member shall exempt him from any further dues.

8. *Regional Branches:* The Governing Council may at its discretion establish regional branches of the Association.

B. *Election:* The election of Fellows (see A1 above), Honorary Fellows Life Members, and Affiliated Societies shall be by the Governing Council.

The election of Members and Sustaining Members shall be by the Executive Board.

Three-fourths of the votes cast shall be requisite for election.

Upon the recommendation of the Committee on Fellowship and Membership the Governing Council may discontinue the Membership, Fellowship or affiliation of any constituent. Three-fourths of the votes cast shall be necessary for such action.

C. *Dues:* Dues are payable annually in advance. All constituents paying dues shall be entitled to receive the AMERICAN JOURNAL OF PUBLIC HEALTH and, or, such other publications as may be designated by the Executive Board, which shall determine the proportion of dues to be devoted to this purpose.

Constituents of any class whose dues are unpaid for six months or more shall be considered not in good standing. Constituents not in good standing shall not be entitled to vote, hold office or enjoy other privileges or powers of membership. Good standing may be resumed upon the payment of all arrears and dues in advance for one year, provided, however, the lapsed period is not greater than one year. The Administrative Office shall notify by registered mail all constituents who have been in arrears for a period of eleven months. The names of constituents in any class whose dues remain unpaid for one year or more shall be presented to the Executive Board which shall order the names of such constituents stricken from the Membership roll, provided, however, such constituents have been duly notified as hereinbefore provided in this paragraph. Constituents whose names have been stricken from the rolls in this manner may be again admitted in the manner provided for the election of new constituents in the class for which they make application, provided such person or organization complies with the eligibility requirements at the time the new application is made.

If, in the opinion of the Executive Board, any member or Fellow of the Association be found (hereafter) to have permitted the use of his name, or otherwise to have allowed himself to be quoted or used for illustration in the advertising of a commercial product, in such a manner as to reflect discredit upon the Association, his Fellowship or Membership in the Association shall thereupon be terminated. The application of this article shall not be retroactive.

ARTICLE II GOVERNING COUNCIL

The thirty members of the Governing Council designated in Article III, Section A, Paragraph 2 of the Constitution, shall be nominated and elected as follows: There shall be a Nominating Committee composed of one Fellow elected by each Section at the preceding annual meeting, and an additional Fellow designated by the Executive Board, the latter serving as Chairman. This committee shall present to the Administrative Office at least two months before the next annual meeting the names of at least twenty and not more than thirty Fellows of the Association selected with due regard to geographical and Membership considerations as nominees for the Governing Council. The Administrative Office shall publish this list to the Membership. Upon the petition of twenty-five Fellows the Nominating Committee shall add the name of any Fellow to this list provided such petition is received fifteen days before the annual meeting. The time for closing the polls shall be determined each year by the Executive Board. The Fellows receiving the highest number of votes on a written ballot cast by the Fellows present and voting at the annual meeting shall be declared elected to fill existing vacancies. Should two or more candidates receive the same number of votes, the Executive Board shall, when necessary, determine by written ballot the order of precedence.

ARTICLE III EXECUTIVE BOARD

A. *Composition:* There shall be an Executive Board of nine members elected by the Governing Council, six of whom shall be past or present members of the Governing Council, and three of whom shall be the President, the President-elect, and the Treasurer.

1. When a Fellow accepts membership on the Executive Board, any position he may hold on any of the standing committees of the Association will thereupon automatically become vacant. This provision will become effective with the close of the annual meeting at which this amendment is adopted, at which time Fellows holding memberships on the Executive Board and any standing com-

mittees will indicate their preference for one or the other.

2. If a vacancy on the Executive Board shall occur after the annual meeting because of the preference of an elected member to retain his standing committee membership, the President shall designate a nominating committee for this purpose from the membership of the Governing Council and this committee shall nominate not less than three candidates for the vacancy, from whom the candidate receiving the highest number of votes in a mail ballot by the Governing Council shall be declared elected to the Executive Board to fill the vacancy.

B. *Terms:* The terms of the President, the President-elect, and the Treasurer as Executive Board members shall be one year each. The terms of the other members shall be three years each, expiring in rotation, two each year. The members of the Executive Board whose terms have not expired shall at the time of the adoption of this amendment continue in office until the expiration of the term for which they have been elected. At the annual meeting at which this amendment is adopted one member shall be elected for a term of two years and two members for a term of three years. Should a vacancy occur the Governing Council shall elect a member to fill such vacancy for the unexpired term. The terms of the members of the Executive Board shall begin at the end of the annual meeting at which they have been elected, and shall continue until the end of the annual meeting at expiration of term, provided that newly elected members of the Board shall have the right to attend meetings as soon as elected, and shall have no vote until installed.

C. *Reëlection:* After two consecutive terms of three years a member of the Executive Board shall be ineligible for reëlection during one Association year. This provision shall not apply to an officer of the Association.

D. *Officers:* The Executive Board shall elect from its own membership a Chairman who shall serve in that capacity for such term as the Executive Board shall determine. It shall also designate such other officers of the Board as it may require for the conduct of its business.

E. *Duties:*

1. To direct the administrative work of the Association.
2. To act as Trustee of the Association's properties.
3. To plan methods for the procurement of funds.
4. To recommend budgets for the Association's work
5. To conform to the policies of the Governing Council in the conduct of its work.
6. To appoint the members of the five Standing Committees and to authorize and confirm the appointment of all other Association committees.
7. To transmit a report of its proceedings and transactions to the Governing Council at least thirty days before each annual meeting.
8. In general to carry out the policies of the Governing Council between meetings of the latter.

F. *A Quorum* of the Executive Board shall consist of four members.

ARTICLE IV OFFICERS

The officers elected by the Governing Council shall be nominated from the floor by that body.

ARTICLE V COMMITTEES

There shall be five standing committees of the Association as follows:

1. Committee on Fellowship and Membership.
2. Committee on Meetings and Publications.
3. Committee on Administrative Practice.
4. Committee on Research and Standards.
5. Committee on Professional Education.

A. *Organization:* All of the Standing and Special Committees of the Association shall be authorized and appointed by the Executive Board unless otherwise provided for in these By-laws. Unless otherwise provided for all Section Committees shall be named by the respective Sections, and the personnel of such committees shall be confirmed by the Executive Board. The appointments of all Association and Section Committees unless otherwise provided for in these By-laws shall expire at the next annual meeting. The Chairmen of the Standing Committees shall be designated by the Executive Board. The Standing Committees shall designate from among their membership such other officers as they may require for the conduct of their business. Each committee shall control its policies within limitations prescribed by the Governing Council and the Executive Board.

The Executive Secretary shall be a member, ex-officio, of all standing Committees, and shall serve as Secretary of each such committee.

B. *Composition and Functions:*

1. The Committee on Fellowship and Membership shall consist of one Fellow to be elected by each Section and an additional Fellow elected by the Executive Board. At the time of the adoption of this amendment the Executive Board shall designate which

five of the members of this committee shall serve for one year, the balance to serve for two years. Thereafter, those designated to fill vacancies shall serve for a term of two years.

This committee shall pass upon the eligibility of Fellows, Members and other constituents, in accordance with the provisions of the By-laws. It shall carry on membership promotion and shall discharge such other duties as are assigned to it by the Governing Council or by the Executive Board.

2. The Committee on Meetings and Publications shall consist of five Fellows. At the time of adoption of this amendment the Executive Board shall elect five Fellows to serve for one, two, three, four and five years respectively. Thereafter, members shall serve for a term of five years.

This committee shall prepare plans and a program for the conduct of annual and other meetings of the Association. All publications of the Association, its Sections and committees shall be issued under the direction of this committee, which shall also be responsible for the editorial and financial policies and management of all such publications.

3. The Committee on Administrative Practice shall consist of fifteen Fellows as follows: Twelve shall be designated by the Executive Board to serve for a term of four years, the terms of three members of this committee expiring each year. The remaining three members of this Committee shall be elected annually by and from the Fellows of the Association, affiliated with the Health Officers Section.

This committee shall engage in the collection of information regarding current public health practices and analyze the material obtained to derive standards of organization and achievement. The findings and standards may be made available to public health workers through publications, information and field service under such conditions as the committee may establish. No standards shall be promulgated as the official and authorized judgment of the Association except with the approval of the Governing Council.

4. The Committee on Research and Standards shall consist of fifteen Fellows representative of the various Sections of the Association appointed by the Executive Board. In the beginning the Executive Board shall designate five who shall serve for a term of one year, five for two years, and five for three years. Thereafter members shall serve for a term of three years.

This committee shall be responsible for carrying out research and the development of standards in the technical branches of public health service, and coördinate such research and standardization. This committee shall also be charged with the duty of reviewing from time to time standards already established. No standards shall be promulgated as the official and authorized judgment of the Association except with the approval of the Governing Council.

5. The Committee on Professional Education shall consist of ten Fellows appointed by the Executive Board. At the time of the adoption of this amendment the Executive Board shall appoint ten Fellows, two to serve for one, two for two, two for three, two for four and two for five years respectively. Thereafter, members shall serve for a term of five years.

This committee shall be responsible for carrying out research and the development of standards for professional education and training in public health work and shall perform such other functions as may be delegated to the committee by the Governing Council with the view of maintaining professional qualifications of high standard. No standards shall be promulgated as the official and authorized judgment of the Association except with the approval of the Governing Council.

ARTICLE VI MEETINGS OF THE ASSOCIATION

There shall be at least one annual meeting of the Association, held at a place to be selected by the Governing Council. All papers and reports presented at the annual meeting and other meetings, including regional meetings, shall be the property of the Association for publication, unless this right is waived by the Committee on Meetings and Publications. Special meetings of the Association may be called by a majority vote of the Governing Council, the Executive Board, or the Association.

ARTICLE VII SECTIONS

The Executive Board shall approve rules and regulations relating to the government of the Sections, and to the appointment of administrative committees. Sections shall elect their own officers.

Nominating Committee: The Section Chairman with the advice of the Section Council shall appoint a Committee on Nominations at least fifteen days before each annual meeting. The Section Secretary shall be a member of such Committee.

The names of the members of the Committee on Nominations shall be announced at the first meeting of the Section, at each annual meeting of the Association. The Committee on Nominations shall present at the second meeting of the Section a list of nominees for

the Section offices, and for membership in the Section Council; provided that if the name of any Fellow be transmitted to the Nominating Committee over the signature of ten Fellows of the Section prior to the second meeting of the Section, the Nominating Committee shall add the name of such Fellow to its own list of nominees.

A. *Officers* of each Section shall be a Chairman, a Vice-Chairman, and a Secretary. The Chairman, Vice-Chairman, and Secretary shall be the representatives of the Section to the Governing Council of the Association.

B. *Terms:* New terms begin and old terms expire at the end of annual meetings. After five consecutive years in any elective Section office, except that of Secretary, a member shall be ineligible to reëlection to that office during one Association year.

C. *The Chairman* shall preside at meetings of the Section.

D. *The Vice-Chairman* shall preside at meetings of the Section in the absence of the Chairman.

E. *The Secretary* of the Section shall prepare the scientific program of the Section for the annual meeting, subject to the recommendations of the Section Council, and he shall submit same to the Committee on Meetings and Publications and shall keep the minutes, and other records of the Section, and shall transmit to the Secretary of the Association a copy of the minutes of both business and scientific sessions as soon as practicable thereafter. When unable to be present at meetings, he shall thoroughly instruct a substitute as far in advance of the meeting as possible.

F. *Section Council:* There shall be a Section Council composed of the three officers of the Section and five members, who shall be Fellows of the Section.

Terms of members of the Section Council shall be five years each. In the beginning one shall serve for one year, one for two, one for three, one for four, and one for five years.

Duties of the Section Council shall be:

1. To recommend papers, and to make general recommendations in relation to the annual meeting program.
2. To advise on Section membership.
3. To advise on Section policies.
4. To submit annually to the Governing Council through the Executive Board a report of the transactions of the Section.
5. To report annually to the Governing Council through the Executive Board on the plans, scope and policy of the Section during the succeeding year.
6. To formulate rules of procedure for the Section.
7. To approve and transmit to the Governing Council resolutions originating in the Section.
8. To advise on the publication of papers and reports presented at the Section meetings.
9. To advise with respect to the appointment of technical committees, sub-committees or Section representatives on committees of the Association.

ARTICLE VIII FINANCES

All remittances to the Association shall be deposited to the account of the Treasurer. The Treasurer shall be custodian of investments of the Association and shall disburse funds in accordance with duly authorized vouchers. With the approval of the Executive Board he may establish a drawing account for the Executive Secretary, who shall send to members of the Executive Board a financial summary of receipts and disbursements each month. Once each month, or oftener if called for, he shall also forward to the Treasurer and President an itemized statement of all expenditures. The Executive Secretary and the Treasurer shall be bonded at the expense of the Association in an amount to be determined by the Executive Board. The books of the Association shall be audited annually by certified public accountants, to be appointed by the Executive Board.

ARTICLE IX AMENDMENTS

These By-laws may be amended by a two-thirds vote of those voting on the Governing Council during the annual meeting, provided that twenty-four hours prior written notice thereof has been given. The By-laws may further be amended by a two-thirds vote of those voting at any meeting of the Governing Council called for the purpose, provided that notice thereof shall have been given at least fifteen days prior to such meeting.

THE AMERICAN PUBLIC HEALTH ASSOCIATION

50 West 50th Street, New York, N. Y.

GOVERNING COUNCIL

OFFICERS 1935–1936

President, Walter H. Brown, M.D., Palo Alto, Calif.
President-elect, Thomas Parran, Jr., M.D., Albany, N. Y.
First Vice-President, Robert E. Wodehouse, M.D., Ottawa, Ont., Can.
Second Vice-President, Professor Samuel C. Prescott, Cambridge, Mass.
Third Vice-President, Angel de la Garza Brito, M.D., Mexico City, Mex.
Treasurer, Louis I. Dublin, Ph.D., New York, N. Y.
Executive Secretary, Reginald M. Atwater, M.D., New York, N. Y.
Chairman of Executive Board, John A. Ferrell, M.D., New York, N. Y.

ELECTIVE COUNCILORS

Terms Expiring 1936

Walter H. Brown, M.D., Palo Alto, Calif.
Samuel J. Crumbine, M.D., New York, N. Y.
A. J. Douglas, M.D., Winnipeg, Man., Can.
Allen W. Freeman, M.D., Baltimore, Md.
Wade H. Frost, M.D., Baltimore, Md.
Thomas Parran, Jr., M.D., Albany, N. Y.
Philip S. Platt, Ph.D., Honolulu, T. H.
Milton J. Rosenau, M.D., Chapel Hill, N. C.
Henry F. Vaughan, Dr.P.H., Detroit, Mich.
C.-E. A. Winslow, Dr.P.H., New Haven, Conn.

Terms Expiring 1937

Donald B. Armstrong, M.D., New York, N. Y.
J. Rosslyn Earp, Dr.P.H., Santa Fe, N. M.
J. G. Fitzgerald, Toronto, Ont., Can.
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Preliminary Meeting	New York, N. Y., April 18	1872
" "	Long Branch, N. J., September 12	1872
1st Annual Meeting	Cincinnati, O., May 1-3	1873
2d " "	New York, N. Y., November 11-14	1873
3d " "	Philadelphia, Pa.	1874
4th " "	Baltimore, Md.	1875
5th " "	Boston, Mass.	1876
6th " "	Chicago, Ill.	1877
7th " "	Richmond, Va.	1878
8th " "	Nashville, Tenn.	1879
9th " "	New Orleans, La.	1880
10th " "	Savannah, Ga.	1881
11th " "	Indianapolis, Ind.	1882
12th " "	Detroit, Mich.	1883
13th " "	St. Louis, Mo.	1884
14th " "	Washington, D. C.	1885
15th " "	Toronto, Ont.	1886
16th " "	Memphis, Tenn.	1887
17th " "	Milwaukee, Wis.	1888
18th " "	Brooklyn, N. Y.	1889

19th Annual Meeting	Charleston, S. C.	1890
20th " "	Kansas City, Mo.	1891
21st " "	Mexico City, Mex.	1892
22d " "	Chicago, Ill.	1893
23d " "	Montreal, Que.	1894
24th " "	Denver, Colo.	1895
25th " "	Buffalo, N. Y.	1896
26th " "	Philadelphia, Pa.	1897
27th " "	Ottawa, Ont.	1898
28th " "	Minneapolis, Minn.	1899
29th " "	Indianapolis, Ind.	1900
30th " "	Buffalo, N. Y.	1901
31st " "	New Orleans, La.	1902
32d " "	Washington, D. C.	1903
33d " "	Havana, Cuba	1904
34th " "	Boston, Mass.	1905
35th " "	Mexico City, Mex.	1906
36th " "	Atlantic City, N. J.	1907
37th " "	Winnipeg, Man.	1908
38th " "	Richmond, Va.	1909
39th " "	Milwaukee, Wis.	1910
40th " "	Havana, Cuba	1911
41st " "	Washington, D. C.	1912
42d " "	Colorado Springs, Colo.	1913
43d " "	Jacksonville, Fla.	1914
44th " "	Rochester, N. Y.	1915
45th " "	Cincinnati, O.	1916
46th " "	Washington, D. C.	1917
47th " "	Chicago, Ill.	1918
48th " "	New Orleans, La.	1919
49th " "	San Francisco, Calif.	1920
50th " "	New York, N. Y.	1921
51st " "	Cleveland, O.	1922
52d " "	Boston, Mass.	1923
53d " "	Detroit, Mich.	1924
54th " "	St. Louis, Mo.	1925
55th " "	Buffalo, N. Y.	1926
56th " "	Cincinnati, O.	1927
57th " "	Chicago, Ill.	1928
58th " "	Minneapolis, Minn.	1929
59th " "	Fort Worth, Tex.*	1930
60th " "	Montreal, Que.	1931
61st " "	Washington, D. C.	1932
62d " "	Indianapolis, Ind.	1933
63d " "	Pasadena, Calif.	1934
64th " "	Milwaukee, Wis.	1935

* Post-Convention Meeting, Mexico City, Mex., 1930.

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Advisers

Epidemiology Section
E. O. Jordan, M.D.
M. V. Veldee, M.D.
Laboratory Section
James A. Newlands

Committee on Water Supply (allocated to Committee on Research and Standards)

A. E. Gorman, *Chairman*, 6743 Olympia Ave., Chicago, Ill.
R. D. Bates
H. M. Freeburn
H. S. Hutton
H. E. Jordan
E. G. Eggert

Industrial Hygiene Section

Committee on Industrial Anthrax (allocated to Committee on Research and Standards)

Henry Field Smyth, M.D., Dr.P.H., *Chairman*, University of Pennsylvania, Philadelphia, Pa.
*Volney S. Cheney, M.D.

* Not a member of the A.P.H.A.

Committee on Standard Practices in the Problem of Compensation of Occupational Diseases (allocated to Committee on Research and Standards)

Henry H. Kessler, M.D., *Chairman*, State Dept. of Labor, 31 Lincoln Park, Newark, N. J.
Elizabeth B. Bricker, M.D.
Bernard S. Coleman
Emery R. Hayhurst, M.D.
May R. Mayers, M.D.
George M. Price, M.D.
Eleanor Rantoul
R. R. Sayers, M.D.

Committee on Volatile Solvents (allocated to Committee on Research and Standards)

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Committee on Lead Poisoning (allocated to Committee on Research and Standards)

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Robert A. Kehoe, M.D.
May R. Mayers, M.D.
*Dorothy K. Minster
William P. Yant

Committee on Skin Irritants (allocated to Committee on Research and Standards)

Henry Field Smyth, M.D., Dr.P.H., *Chairman*, University of Pennsylvania, Philadelphia, Pa.

Committee on Ventilation and Atmospheric Pollution (allocated to Committee on Research and Standards)

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Philip Drinker
Leonard Greenburg, M.D.
William J. McConnell, M.D.
Carey P. McCord, M.D.

* Not a member of the A.P.H.A.

Food and Nutrition Section

Committee on Standard Methods of Vitamin D Bio-assay of Milk (allocated to Committee on Research and Standards)

Elmer M. Nelson, Ph.D., *Chairman*, U. S. Department of Agriculture, Washington, D. C.
John W. M. Bunker, Ph.D.
William E. Krauss, Ph.D.
Robert W. Pilcher, Ph.D.
Henry T. Scott, Ph.D.
George C. Supplee, Ph.D.

Committee on Participation in Standard Methods (allocated to Committee on Research and Standards)

Fred C. Blanck, Ph.D., *Chairman*, U. S. Department of Agriculture, Washington, D. C.
Carl R. Fellers, Ph.D.
James H. Shrader, Ph.D.

Committee on Fellowship and Membership (allocated to Committee on Fellowship and Membership)

Ferdinand A. Korff, *Chairman*, City Department of Health, Baltimore, Md.
Ray W. Clough, Ph.D.
Marietta Eichelberger, Ph.D.
Hugh N. Heffernan
Raymond Hertwig
A. J. G. Hood, D.V.M.
Henry M. Loomis
Harry W. von Loesecke

Committee on Nutritional Problems (allocated to Committee on Research and Standards)

D. Breese Jones, Ph.D., *Chairman*, U. S. Department of Agriculture, Washington, D. C.
Paul L. Day, Ph.D.
Walter H. Eddy, Ph.D.
Conrad A. Elvehjem, Ph.D.
Frank L. Gunderson, Ph.D.
Charles G. King, Ph.D:
Elmer V. McCollum, Ph.D.

Committee on Milk and Dairy Products (allocated to Committee on Research and Standards)

William B. Palmer, *Chairman*, City Hall, Orange, N. J.

Oscar E. Boisvert
Frederick W. Fabian, Ph.D.
George W. Grimm, D.V.M.
Ferdinand A. Korff
Merrill J. Mack
Margaret C. Smith, Ph.D.
James A. Tobey, Dr.P.H.

Committee on Microbiological Methods of Food Examination (allocated to Committee on Research and Standards)

Lawrence H. James, Ph.D., *Chairman,* U. S. Department of Agriculture, Washington, D. C.
Philip K. Bates, Ph.D.
Leon A. Bradley, Ph.D.
Edwin J. Cameron, Ph.D.
Francis P. Griffiths, Ph.D.
Albert C. Hunter, Ph.D.
Carl S. Pederson, Ph.D.
Fred W. Tanner, Ph.D.

Committee on Foods (except milk) (allocated to Committee on Research and Standards)

Bernard E. Proctor, Ph.D., *Chairman,* Massachusetts Institute of Technology, Cambridge, Mass.
Henry C. Becker, M.D.
Henry M. Lancaster
Horatio N. Parker
Lydia J. Roberts, Ph.D.
Margaret R. Sandels, Ph.D.
Julian H. Toulouse, Ph.D.
Donald K. Tressler, Ph.D.

Public Health Education Section

Committee on Methods in Health Education (unallocated)

Ira V. Hiscock, *Chairman,* Yale University, *New Haven, Conn.*
Homer N. Calver
Mary P. Connolly
Iago Galdston, M.D.
Elizabeth Nickerson
Evart G. Routzahn
William P. Shepard, M.D.
C. E. Turner, Dr.P.H.

Public Health Nursing Section

Editorial Committee (allocated to Committee on Meetings and Publications)

Katharine Faville, R.N., *Chairman,* Western Reserve University, Cleveland, Ohio
Leah M. Blaisdell, R.N.
Helen Bond, R.N.
Rachel K. Miller, R.N.
Eva F. MacDougall, R.N.

Committee on Membership and Fellowship (allocated to Committee on Fellowship and Membership)

I. Malinde Havey, R.N., *Chairman,* 3415 Morrison Street, N.W., Washington, D. C.
Mary Dunn, R.N.
Alma Haupt, R.N.
Ruth Houlton, R.N.

Committee to Study Public Health Nursing in State Health Departments in Coöperation with the National Organization for Public Health Nursing (allocated to Committee on Administrative Practice)

Marion Sheahan, R.N., *Chairman,* State Bureau of Public Health Nursing, Albany, N. Y.
Margaret East, R.N.
Alma Haupt, R.N. (representing the N.O.P.H.N.)
Eleanor Kennedy, R.N.
Olivia Peterson, R.N.

Epidemiology Section

Committee on Bathing Places (to coöperate with Committee on Bathing Places of Public Health Engineering Section)

M. J. Rosenau, M.D.
L. L. Arnold, M.D.

Committee on Waterways Pollution (to coöperate with Committee on Waterways Pollution of Public Health Engineering Section)

Milton V. Veldee, M.D.
Edwin O. Jordan, M.D.

AFFILIATED STATE PUBLIC HEALTH SOCIETIES

CONNECTICUT PUBLIC HEALTH ASSOCIATION. Affiliated with the American Public Health Association 1928. Object—To protect and promote public health and safety. Officers—President, B. B. Robbins, M.D.; Vice-President, L. J. Dumont, M.D.; Secretary-Treasurer, Professor Ira V. Hiscock.

FLORIDA PUBLIC HEALTH ASSOCIATION, INC. Affiliated with the American Public Health Association 1932. Objects—To assist in protecting and promoting public health, to provide for scientific advancement of members, and to extend and develop the public health movement. Officers—President, T. H. D. Griffitts, M.D.; First Vice-President, W. E. Van Landingham, M.D.; Second Vice-President, Russell Broughman; Secretary-Treasurer, Stewart G. Thompson, D.P.H.

GEORGIA PUBLIC HEALTH ASSOCIATION. Affiliated with the American Public Health Association 1930. Objects—To assist in protecting public health, to provide for scientific advancement of members, and to extend and develop the public health movement. Officers—President, Dr. Hugo Robinson; Secretary, Millard E. Winchester, M.D.

MASSACHUSETTS PUBLIC HEALTH ASSOCIATION. Affiliated with the American Public Health Association 1925. Objects—The advancement of sanitary science in the State of Massachusetts, the promotion of better organization and coöperation in the local Boards of Health, the uniform enforcement of sanitary laws and regulations and the establishment of pleasant social relations among members of the Association. Officers—President, Paul R. Withington, M.D.; First Vice-President, Ernest M. Morris, M.D.; Second Vice-President, Professor Curtis M. Hilliard; Secretary-Treasurer, G. Donald Buckner.

MICHIGAN PUBLIC HEALTH ASSOCIATION. Affiliated with the American Public Health Association 1922. Object—To promote the interest of public health in Michigan. Officers—President, Garner M. Byington, M.D.; Vice-President, J. D. Brook, M.D.; Secretary-Treasurer, Marjorie Delavan.

MISSOURI PUBLIC HEALTH ASSOCIATION. Affiliated with the American Public Health Association 1928. Objects—To assist in protecting and promoting public health; to provide for scientific advancement of its members, and to extend and develop the public health movement in Missouri. Officers—President, J. F. Bredeck, M.D., First Vice-President, Dr. W. A. Norris; Second Vice-President, Elnore Hackman; Secretary, C. F. Adams, M.D.; Treasurer, Joe Kruegel.

NEW MEXICO PUBLIC HEALTH ASSOCIATION. Affiliated with the American Public Health Association 1925. Object—To encourage the advancement of public health work in the state. Officers—President, Dr. Eugene P. Sims; Vice-President, Dr. Walter E. Kase; Secretary-Treasurer, Paul S. Fox, C.E.

NORTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION. Affiliated with the American Public Health Association 1927. Objects—To aid in the promotion and protection of public health; to provide for scientific advancement of members; and to extend and develop the public health movement; to aid in the promulgation and enforcement of state and local legislation in the interest of public health; to render service and volunteer trained assistance in times of stress or need to state or local health authorities. Officers—President, J. C. Geiger, M.D.; President-Elect, E. H. Coleman, M.D.; Vice-President, Samuel H. Greene; Secretary, I. O. Church, M.D.; Treasurer, Helen Hartley, R.N.

OHIO FEDERATION OF PUBLIC HEALTH OFFICIALS. Affiliated with the American Public Health Association 1927. Objects—To unite the official Public Health Employees of Ohio for educational, social and other beneficial endeavors; to encourage and promote improvement in public health service and in the status of public health employees in the State of Ohio; to encourage and promote a more active and favorable public interest in public health; to coöperate with other organizations and groups in promoting and furthering like objects; to be the official Ohio Section of the American Public Health Association. Officers—President, W. G. Rhoten, M.D.; Vice-President, A. G. Sturgiss, M.D.; Secretary-Treasurer, W. D. Bishop, M.D.

PENNSYLVANIA PUBLIC HEALTH ASSOCIATION. Affiliated with the American Public Health Association 1925. Object—To protect and promote public and personal health in Pennsylvania. Officers—President, James R Smith, M.D.; First Vice-President, Thomas Henderson, M.D.; Second Vice-President, Harry A. Fritschman; Executive Secretary, J. Clarence Funk; Treasurer, A. J. Bohl; Assistant Treasurer, Arthur M. Dewees.

SOUTH CAROLINA PUBLIC HEALTH ASSOCIATION. Affiliated with the American Public Health Association 1928. Object—To

protect and promote public health in South Carolina. Officers—President, Dr. B. M. Wyman; Vice-President, Dr. W. A. Carrigan; Secretary-Treasurer, Laura Blackburn, R.N.

SOUTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION. Affiliated with the American Public Health Association 1927. Objects—To assist in the protection and promotion of public health; to provide for the scientific advancement of its members; to extend and develop the public health movement. Officers—President, E. B. Godfrey, M.D.; President-Elect, R. V. Stone, M.D.; First Vice-President, R. C. Main, M.D.; Second Vice-President, W. F. Fox, M.D.; Secretary-Treasurer, T. P. B. Jones.

TEXAS PUBLIC HEALTH ASSOCIATION. Affiliated with the American Public Health Association 1925. Objects—To promulgate for public health workers courses of instruction and the general advancement of knowledge for sanitary improvements and for their encouragement; to provide social intercourse among its members and a friendly exchange of information and experiences. Officers—President, F. R. Tucker, M.D.; First Vice-President, Dr. Burke Brewster; Second Vice-President, Edward Robinson; Third Vice-President, Mrs. Ida Levinson; Fourth Vice-President, H. E. Hargis; Secretary-Treasurer, Lewis Bracy.

VIRGINIA PUBLIC HEALTH ASSOCIATION. Affiliated with the American Public Health Association 1925. Object—To promote the public health and all objects of the American Public Health Association. Officers—President, B. B. Bagby, M.D.

WEST VIRGINIA PUBLIC HEALTH ASSOCIATION. Affiliated with the American Public Health Association 1927. Object—To promote public and personal health, especially in West Virginia. Officers—President, A. J. Kemper, M.D.; First Vice-President, W. G. C. Hill, M.D.; Second Vice-President, R. M. Pedicord, M.D.; Secretary-Treasurer, John Thames, M.D.

WESTERN BRANCH, AMERICAN PUBLIC HEALTH ASSOCIATION

Affiliated with the American Public Health Association 1930. Object: To protect and promote public and personal health, and to promote better health service in the western portions of the United States and the Dominion of Canada, and in certain islands of the Pacific. Membership consists of the constituents of all classes of the American Public Health Association in the following territory: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming, Alaska, Hawaii, Philippine Islands, British Columbia (Canada). Officers—President, W. F. Cogswell, M.D.; President-Elect, H. E. Young, M.D.; First Vice-President, J. D. Dunshee, M.D.; Second Vice-President, J. L. Jones, M.D.; Third Vice-President, W. H. Kellogg, M.D.; Secretary, W. P. Shepard, M.D.; Treasurer, W. F. Higby.

Meetings: 1st Annual Meeting—Salt Lake City, Utah—June 12–14, 1930; 2d Annual Meeting—Seattle, Wash.—May 28–30, 1931; 3d Annual Meeting—Denver, Colo.—June 2–4, 1932; 4th Annual Meeting—Pasadena, Calif.—May 29–31, 1933; 5th Annual Meeting held in conjunction with the Sixty-Third Annual Meeting of the American Public Health Association in Pasadena, Calif., September 3–6, 1934; 6th Annual Meeting—Helena, Montana—July 1–4, 1935; 7th Annual Meeting—Vancouver, B. C.—June 24–27, 1936.

SOUTHERN BRANCH, AMERICAN PUBLIC HEALTH ASSOCIATION

Affiliated with the American Public Health Association 1932. Object—The closer bringing together of public health workers for the purpose of fostering and stimulating a greater degree of scientific effort in the discharge of their duties in the protection and promotion of public and personal health. Membership is limited to persons who are members of the American Public Health Association and may be drawn from Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Texas, Virginia, West Virginia, and Tennessee; and from the District of Columbia, Mexico, Cuba, Puerto Rico and such other territory as includes membership in the American Public Health Association in the tropics and sub-tropics.

Officers—President, I. C. Riggin, M.D.; First Vice-President, C. J. Vaughn, M.D.; Second Vice-President, Frances Montgomery, R.N.; Third Vice-President, M. Z. Bair; Secretary-Treasurer, G. Foard McGinnes, M.D.

Meetings: 1st Annual Meeting—Birmingham, Ala.—November 14–16, 1932; 2nd Annual Meeting, Richmond, Va.—November 13, 1933; 3rd Annual Meeting, San Antonio, Tex.—November 12–14, 1934; 4th Annual Meeting—St. Louis, Mo.—November 19–20, 1935; 5th Annual Meeting—Baltimore, Md.—November, 1936.

Resolutions

THE Chairman of the Resolutions Committee, John A. Ferrell, M.D., read the following resolutions, which were unanimously adopted by the Governing Council, October 9, 1935.

I. IN MEMORIAM

RESOLVED, that it is with a sense of irreparable loss that the American Public Health Association records the deaths, since our last Annual Meeting, of the following fifty members and Fellows:

H. L. Abramson, M.D., St. John, N. B., Canada. Elected Member 1919
H. L. Akridge, M.D., Brunswick, Ga. Elected Member 1923, Fellow 1929
Lemar W. Andrews, M.D., Warsaw, N. Y. Elected Member 1919
C. A. Bevan, M.D., West Haven, Conn. Elected Member 1918, Fellow 1923
George H. Bigelow, M.D., Boston, Mass. Elected Member 1923, Fellow 1929
Dr. John H. Blanks, Zion, Ill. Elected Member 1925
J. A. Chevigny, M.D., Hammond, Ind. Elected Member 1931
Marguerite J. Clancy, R.N., Asbury Park, N. J. Elected Member 1926
E. Linwood Cornman, V.M.D., Marietta, Pa. Elected Member 1926
Henry A. Cotton, M.D., Trenton, N. J. Elected Member 1932
Nelson C. Davis, M.D., Bahia, Brazil, S. A. Elected Member 1923
F. F. DeVore, M.D., Toledo, O. Elected Member 1927
C. St. Clair Drake, M.D., Jacksonville, Ill. Elected Member 1914
Francis C. Driscoll, A.B., Quincy, Mass. Elected Member 1934
Carroll W. Eddy, D.V.M., Cleveland, O. Elected Member 1926
M. Frances Etchberger, Baltimore, Md. Elected Member 1931
Harry F. Ferguson, Springfield, Ill. Elected Member 1916
Frederick T. Fitch, M.D., East Hampton, Conn. Elected Member 1932
M. B. Harutun, M.D., Joplin, Mo. Elected Member 1920, Fellow 1923
M. O. Heckard, M.D., Chicago, Ill. Elected Member 1907, Fellow 1922
W. G. Hollingworth, D.V.S., Utica, N. Y. Elected Member 1919, Fellow 1926
John C. Humphreys, M.D., Philadelphia, Pa. Elected Member 1926
George W. Hunter, Ph.D., Claremont, Calif. Elected Member 1928
George H. Jennings, M.D., Jewett City, Conn. Elected Member 1916
J. H. Kuser, M.D., San Rafael, Calif. Elected Member 1920
John LeFeber, Milwaukee, Wis. Elected Member 1913
George T. Lennon, Haverhill, Mass. Elected Member 1918
Jorge Le-Roy, M.D., Havana, Cuba. Elected Member 1911, Fellow 1923
Charles W. Many, M.D., Doylestown, Pa. Elected Member 1917
Mae E. Mathers, R.N., Ashland, Va. Elected Member 1934
Lucy Minnigerode, R.N., Washington, D. C. Elected Member 1924
Paul F. Nichols, M.S., Berkeley, Calif. Elected Member 1934
Charles Norris, M.D., New York, N. Y. Elected Member 1920
Herbert C. Ober, M.D., D.M.D., Newton, Mass. Elected Member 1932
Dr. James M. Parrott, Raleigh, N. C. Elected Member 1932
Mrs. William L. Putnam, Boston, Mass. Elected Member 1915
Vernon Robins, M.D., Louisville, Ky. Elected Member 1916, Fellow 1922
Charles V. Roman, M.D., Nashville, Tenn. Elected Member 1926
Mrs. Joseph Sanders, Washington, D. C. Elected Member 1933
Anna M. Scholfield, Providence, R. I. Elected Member 1932
Kathryn Schulken, R.N., Denver, Colo. Elected Member 1931, Fellow 1934
G. H. Sherman, M.D., Detroit, Mich. Elected Member 1918
Sir Clifford Sifton, Toronto, Ont., Canada. Honorary Fellow
Thomas J. Strauch, Richmond, Va. Elected Member 1919
Charles Strauss, New York, N. Y. Elected Member 1914
George R. Thompson, M.D., Luzerne, N. Y. Elected Member 1931
A. Brioso Vasconcelos, M.D., Mexico City,

Mex. Elected Member 1921, Fellow 1923
William H. Wakelee, Southbury, Conn. Elected Member 1933
Henry P. Walcott, M.D., Cambridge, Mass. Honorary Fellow
Prof. John Weinzirl, Seattle, Wash. Elected Member 1906, Fellow 1922

II. ENVIRONMENTAL SANITATION

WHEREAS there exist along the boundary between Mexico and the United States various important health problems, including especially those relating to environmental sanitation, and

WHEREAS the solution of these problems involves the concerted efforts of the public health authorities of both countries and of the states concerned, and

WHEREAS plans for dealing with these problems should be coöperatively formulated and effectively carried out, therefore be it

RESOLVED, that the American Public Health Association is in sympathy with the objectives stated, and that its President is authorized in his discretion to appoint a committee to coöperate with the health authorities, federal, and state, of both countries, in formulating a suitable program and in carrying it out.

III. RESOLUTION TO LOCAL COMMITTEE AND OTHER LOCAL GROUPS

RESOLVED, that the officers and members of the American Public Health Association present at its 64th Annual Meeting in Milwaukee, Wis., express their deep appreciation to the Mayor, the Common Council, the City Departments and the citizenry of Milwaukee for their warm reception and generous hospitality; and be it further

RESOLVED, that the gratitude of the officers and members be extended to Dr. John P. Koehler, Health Commissioner of Milwaukee, and General Chairman of the Local Committee, to every member of his committee, and to all organizations represented thereon, and to the Wisconsin State Board of Health, under the direction of Dr. C. A. Harper, for their many courtesies and efficient helpfulness and generosity in their provisions for this meeting, and be it further

RESOLVED, that the sincere admiration and thanks of the assembled membership be recorded to Dr. John P. Koehler, and to every one of his assistants and helpers for their devoted attention to the planning and conduct of this meeting, which will be long remembered as one of the most successful in the Association's history.

IV. RESOLUTION TO PRESS AND RADIO

RESOLVED, that the American Public Health Association acknowledge its indebtedness to the press and the radio, national, state, and local, for their excellence of service in connection with its 64th Annual Meeting.

V. RESOLUTION TO MILWAUKEE HOTELS

RESOLVED, that the American Public Health Association record its appreciation to the Milwaukee Association of Commerce, the Milwaukee Auditorium, and the Hotel Schroeder and other Milwaukee hotels, for their valuable assistance in the conduct of its 64th Annual Meeting.

VI. RESOLUTION TO EXECUTIVE OFFICE STAFF AND COMMITTEE ON MEETINGS AND PUBLICATIONS

RESOLVED, that the commendation of the officers and the members be recorded to the Executive Office Staff of the American Public Health Association, particularly with reference to the Committee on Meeting and Publications, for efficient service in connection with the 64th Annual Meeting.

The Health Conservation Contests

SINCE 1929 the Chamber of Commerce of the United States with the coöperation of the American Public Health Association has conducted annually a Health Conservation Contest for cities. The success of these competitions was so outstanding that in 1934 a similar Contest for rural areas was inaugurated.

The names of the first award and honorable mention winners in both Contests since their inception are listed below:

1929 City Health Contest Awards *

Group I:
Winning City: Milwaukee, Wis.
Honorable Mention Cities: Detroit, Mich., Philadelphia, Pa., San Francisco, Calif., Brooklyn, N. Y., and Buffalo, N. Y.

Group II:
Winning City: Syracuse, N. Y.
Honorable Mention Cities: New Haven, Conn., Rochester, N. Y., Cincinnati, Ohio, Yonkers, N. Y., and Albany, N. Y.

Group III:
Winning City: East Orange, N. J.
Honorable Mention Cities: Rockford, Ill., Racine, Wis., Pasadena, Calif., Harrisburg, Pa., and Greensboro, N. C.

Group IV:
Winning City: White Plains, N. Y.
Honorable Mention Cities: Cumberland, Md., Alhambra, Calif., Aurora, Ill., Durham, N. C., and Santa Ana, Calif.

Group V:
Winning City, Sidney, Ohio
Honorable Mention Cities: LaSalle, Ill., South Orange, N. J., Eureka, Kans., Palo Alto, Calif., and Natchitoches, La.

1930 City Health Contest Awards †

Group I:
Winning City: Detroit, Mich.
Honorable Mention Cities: Milwaukee, Wis., Philadelphia, Pa., San Francisco, Calif., Baltimore, Md., and Buffalo, N. Y.

Group II:
Winning City: Newark, N. J.
Honorable Mention Cities: Cincinnati, Ohio, Rochester, N. Y., Kansas City, Mo., Denver, Colo., and Memphis, Tenn.

Group III:
Winning City: New Haven, Conn.
Honorable Mention Cities: Syracuse, N. Y., Yonkers, N. Y., Hartford, Conn., Utica, N. Y., and Reading, Pa.

Group IV:
Winning City: Racine, Wis.
Honorable Mention Cities: Harrisburg, Pa., Evanston, Ill., East Orange, N. J., Durham, N. C., and Pasadena, Calif.

Group V:
Winning City: Alhambra, Calif.
Honorable Mention Cities: Salem, Ore., White Plains, N. Y., West Orange, N. J., Watertown, N. Y., and Fargo, N. D.

Group VI:
Winning City: Chestertown, Md.
Honorable Mention Cities: Sidney, Ohio, South Orange, N. J., Albany, Ga., Palo Alto, Calif., and LaSalle, Ill.

1931 City Health Contest Awards †

Group I:
Winning City: Milwaukee, Wis.
Honorable Mention Cities: Baltimore, Md., Detroit, Mich., Philadelphia, Pa., Pittsburgh, Pa., and St. Louis, Mo.

Group II:
Winning City: Rochester, N. Y.
Honorable Mention Cities: Cincinnati, Ohio, Kansas City, Mo., Minneapolis, Minn., Newark, N. J., and Toledo, Ohio

Group III:
Winning City: New Haven, Conn.
Honorable Mention Cities: Grand Rapids, Mich., Hartford, Conn., Syracuse, N. Y., Utica, N. Y., and Yonkers, N. Y.

Group IV:
Winning City: Evanston, Ill.
Honorable Mention Cities: East Orange, N. J., Harrisburg, Pa., Kenosha, Wis., Pasadena, Calif., and Racine, Wis.

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* Group I—Cities of over 500,000 population
" II—Cities of 100,000 to 500,000 population
" III—Cities of 50,000 to 100,000 population
" IV—Cities of 20,000 to 50,000 population
" V—Cities under 20,000 population

† Group I—Cities of over 500,000 population
" II—Cities of 250,000 to 500,000 population
" III—Cities of 100,000 to 250,000 population
" IV—Cities of 50,000 to 100,000 population
" V—Cities of 20,000 to 50,000 population
" VI—Cities under 20,000 population

Group V:
Winning City: Brookline, Mass.
Honorable Mention Cities: Alhambra, Calif., Maplewood, N. J., Newburgh, N. Y., Orange, N. J., West Orange, N. J., and Watertown, N. Y.
Group VI:
Winning City: LaSalle, Ill.
Honorable Mention Cities: Chestertown, Md., Lodi, Calif., Monrovia, Calif., Palo Alto, Calif., and Shorewood, Wis.

1932 CITY HEALTH CONTEST AWARDS †

Group I:
Winning City: Detroit, Mich.
Honorable Mention Cities: Milwaukee, Wis., Chicago, Ill., Baltimore, Md., Pittsburgh, Pa., and Buffalo, N. Y.
Group II:
Winning City: Cincinnati, Ohio
Honorable Mention Cities: Rochester, N. Y., Newark, N. J., Toledo, Ohio, Minneapolis, Minn., and Dallas, Tex.
Group III:
Winning Cities: Syracuse, N. Y., and New Haven, Conn. (Tied)
Honorable Mention Cities: Peoria, Ill., Hartford, Conn., Grand Rapids, Mich., Reading, Pa., and Yonkers, N. Y.
Group IV:
Winning City: East Orange, N. J.
Honorable Mention Cities: Evanston, Ill., Pasadena, Calif., Schenectady, N. Y., Pittsfield, Mass., Charleston, S. C., and Lincoln, Nebr.
Group V:
Winning City: Brookline, Mass.
Honorable Mention Cities: Santa Barbara, Calif., West Hartford, Conn., Newburgh, N. Y., Watertown, N. Y., and Santa Ana, Calif.
Group VI:
Winning City: Lodi, Calif.
Honorable Mention Cities: Chestertown, Md., Shorewood, Wis., Palo Alto, Calif., LaSalle, Ill., and Peru, Ill.

1933 CITY HEALTH CONTEST AWARDS †

Special Award Cities (Those cities which have twice won First Award and in 1933 have maintained their previous high standards): Detroit, Mich., Milwaukee, Wis., Syracuse, N. Y., New Haven, Conn., and Brookline, Mass.

Group I:
Winning City: Baltimore, Md.
Honorable Mention Cities: Chicago, Ill., and Pittsburgh, Pa.
Group II:
Winning City: Rochester, N. Y.
Honorable Mention Cities: Cincinnati, Ohio, Oakland, Calif., Newark, N. J., Toledo, Ohio, Kansas City, Mo., and Dallas, Tex.
Group III:
Winning City: Hartford, Conn.
Honorable Mention Cities: Grand Rapids, Mich., Duluth, Minn., Reading, Pa., Erie, Pa., and Honolulu, Hawaii
Group IV:
Winning City: Schenectady, N. Y.
Honorable Mention Cities: Pasadena, Calif., Evanston, Ill., Madison, Wis., Charleston, S. C., and Harrisburg, Pa.
Group V:
Winning City: Hackensack, N. J.
Honorable Mention Cities: Santa Ana, Calif., Watertown, N. Y., Pittsfield, Mass., Maplewood, N. J., and Hagerstown, Md.
Group VI:
Winning City: Palo Alto, Calif.
Honorable Mention Cities: Chestertown, Md., Helena, Mont., Winnetka, Ill., McComb, Miss., Emporia, Kans., and Richmond, Ky.

1934 CITY HEALTH CONTEST AWARDS †

Special Award Cities (Those cities which have twice won First Award and in 1934 have maintained their previous high standards): Brookline, Mass., Detroit, Mich., Milwaukee, Wis., New Haven, Conn., and Syracuse, N. Y.
Group I:
Winning City: Baltimore, Md.
Honorable Mention City: Buffalo, N. Y.
Group II:
Winning City: Newark, N. J.
Honorable Mention Cities: Minneapolis, Minn., Toledo, Ohio, and Dallas, Tex.
Group III:
Winning City: Honolulu, Hawaii
Honorable Mention Cities: Hartford, Conn., Grand Rapids, Mich., Springfield, Mass., Duluth, Minn., Yonkers, N. Y., Reading, Pa., and Utica, N. Y.
Group IV:
Winning City: Pasadena, Calif.
Honorable Mention Cities: Kalamazoo, Mich., Schenectady, N. Y., Evanston, Ill., Waterbury, Conn., Sacramento, Calif., Binghamton, N. Y., San Jose, Calif.,

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† Group I—Cities of over 500,000 population
" II—Cities of 250,000 to 500,000 population
" III—Cities of 100,000 to 250,000 population
" IV—Cities of 50,000 to 100,000 population
" V—Cities of 20,000 to 50,000 population
" VI—Cities under 20,000 population

New Rochelle, N. Y., and Greensboro, N. C.

Group V:

Winning City: Hackensack, N. J.

Honorable Mention Cities: Watertown, N. Y., Pittsfield, Mass., Auburn, N. Y., Greenwich, Conn., and Santa Barbara, Calif.

Group VI:

Winning City: Palo Alto, Calif.

Honorable Mention Cities: Englewood, N. J., Cliffside Park, N. J., Hibbing, Minn., and Miami Beach, Fla.

1934 RURAL HEALTH CONTEST AWARDS *

Northeastern Division:

Winning Counties: Cattaraugus County, N. Y., and Westchester County, N. Y. (tied)

Honorable Mention Counties: Columbia County, N. Y., Barry County, Mich., Southern Berkshire District, Mass., Allegan County, Mich., and Eaton County, Mich.

Eastern Division:

Winning County: Kent County, Md.

Honorable Mention Counties: Davidson County, Tenn., Ohio County, W. Va., Rutherford County, Tenn., Washington County, Md., Forsyth County, N. C., and Sullivan County, Tenn.

Southeastern Division:

Winning County: Glynn County, Ga.

Honorable Mention Counties: Charleston County, S. C., Lauderdale County, Miss., Pike County, Miss., and Leon County, Fla.

North Central Division:

Winning County: Woodbury County, Iowa

Honorable Mention County: Lyon County, Kan.

South Central Division:

Winning County: El Paso County, Tex.

Honorable Mention Counties: None

Western Division:

Winning County: San Joaquin Health District, Calif.

Honorable Mention Counties: Los Angeles County, Calif., Santa Barbara County, Calif., Spokane County, Wash., and Yakima County, Wash.

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* Northeastern Division: Connecticut, Illinois, Indiana, Maine, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, and Wisconsin.
Eastern Division: Delaware, Kentucky, Maryland, North Carolina, Tennessee, Virginia, and West Virginia.
Southeastern Division: Alabama, Florida, Georgia, Mississippi, and South Carolina.
North Central Division: Colorado, Iowa, Kansas, Minnesota, Missouri, Montana, Nebraska, North Dakota, South Dakota, and Wyoming.
South Central Division: Arkansas, Louisiana, New Mexico, Oklahoma, and Texas.
Western Division: Arizona, California, Idaho, Nevada, Oregon, Utah, and Washington.

Studies and Surveys

Made by the Committee on Administrative Practice (1925–1935)

State	Surveyed City	Surveyed County	Surveyed State
Arkansas	(1925) Little Rock		
California	(1927) Burbank (1927) Glendale (1928) South Pasadena (1929) San Francisco*	(1928) Los Angeles (1929) Santa Barbara	
Canada	(1928) Montreal*		
Colorado	(1928) Denver*		
Connecticut	(1934) Hartford* (1935) Hartford (Indigent Sick Study)		
District of Columbia	(1929) Washington*†		
Georgia	(1927) Athens (1928, 1929, 1930 resurveyed)	(1927) Clarke (1928, 1929, 1930 resurveyed)	
Hawaii	(1929) Honolulu*		
Illinois	(1927) Chicago (1931) Chicago (1933) Chicago (1935) Chicago (Tb. Study)		
Indiana	(1926) Terre Haute		
Iowa	(1925) Des Moines (1935) Des Moines*		
Kansas	(1924) Kansas City†		
Kentucky	(1935) Louisville¶		
Maine	(1931) Bar Harbor		
Massachusetts	(1933) Cambridge (Tb. Study) (1930) Everett (1927) Hingham (1927) Quincy (1929 resurveyed) (1927) Lowell* (1929) Milton (1928) Wellesley	(1930) Southern Berkshire* (1931) Nashoba*	(1929) Mass.* (1935) Mass. (Laws)
Michigan	(1934) Detroit Clinic*	(1935) Mich. Community Health Project	(1928) Mich.*
Missouri	(1930) Kansas City*† (1927) St. Louis†		
Mississippi		(1931) Pike (1931) Lauderdale	
New Jersey	(1926) Elizabeth (1933) Montclair‡	(1928) Monmouth†	
New Mexico			(1934) N. M.*
New York	(1924) Syracuse (1927, 1928 resurveyed) (1934) Syracuse Study (Woodycrest San.) (1926) New York City (1932) New York City (1933) New York City (Harlem)	(1926) Cattaraugus (1927, 1928, 1929 resurveyed) (1928) Tompkins	

State	Surveyed City	Surveyed County	Surveyed State
New York (cont.)	(1934) New York City Appraisal* (1934) New York City Personnel Study (1927) Olean		
North Carolina	(1935) Charlotte	(1928) Pitt	
North Dakota	(1927) Fargo* (1928, 1930 resurveyed)		
Ohio	(1927) Cincinnati* (1926) Springfield*	(1926) Preble*	(1928) Ohio* (1931) Ohio*
Oregon	(1929) Portland*	(1927) Marion (1928, 1929, 1930 resurveyed) (1929) Jackson	
Pennsylvania	(1924) Wilkes Barre (1927) Scranton†		
Rhode Island	(1928) Warwick* (1929) Providence*†		
South Carolina	(1927) Spartanburg*		
Tennessee	(1926) Knoxville* (1924) Memphis (1930 resurveyed) (1929) Nashville	(1930) Shelby* (1927) Rutherford (1928, 1929, 1930 resurveyed) (1929) Davidson* (1930) Gibson (1930) Sullivan	
Texas	(1925) Austin (1925) Fort Worth		
Washington	(1934) Tacoma‖	(1935) Spokane*§	
West Virginia	(1924) Charleston		

* Survey printed
† Hospital also
‡ Hospital only
‖ City Contest free survey (1934)
¶ City Contest free survey (1935)
§ Rural Contest free survey (1935)

The American Museum of Hygiene

YOUR committee is particularly pleased to report the further crystallization of interest in Chicago. Although the local committee organization which was referred to in our report last year did not materialize, definite progress is being made under the leadership of Max Epstein. He has prepared, with the assistance of members of your committee, a preliminary descriptive outline for what is tentatively designated a Center of Health. This very well carries out the concept of the committee for a broad program embracing all phases of health and public health presented through the most modern exhibit and educational devices. This proposal has been favorably received by the Planning Committee of the Chicago Exposition Authority, which group has in hand the creation of a permanent exposition on part of the site of the Century of Progress.

We look forward to the first separate American Museum of Hygiene being a permanent and important unit in that exposition. Former plans for developing a health and medical section of the Museum of Science and Industry in Chicago, using exhibits from the Century of Progress as a nucleus, have been laid aside pending this new development. The desirability of a separate institution has continuously been stressed with interested people in Chicago.

A second development of importance is taking place in New York. In this city, work is already under way in constructing animated exhibits for a new section on hygiene in the American Museum of Natural History. This work is financed by a P.W.A. grant and members of your committee are advising with those responsible for this section. We have also made available to them the complete files of information which the committee has assembled. Although the present plans for this section fall short of the complete program which was proposed to the Museum of Natural History in 1930 by the secretary of your committee, it is a progressive step in health education. As such, it may serve to stimulate interest in the eventual establishment in New York City of a Museum of Hygiene adequate to the opportunities which this great city offers.

A third development of considerable interest has occurred on the West Coast. During the year the Western Branch of the American Public Health Association created a Committee on Health Education Exhibit Material. The studies of that committee have led it to conclude that the Western Branch may well become active and undertake a continuous program in this field. It believes particularly that "an unusual opportunity exists for the presentation of an outstanding exhibit or museum on public health at the International Exposition to be held in the San Francisco Bay area in 1938." A resolution was adopted by the Western Branch approving such an undertaking and including the proposal that such an exhibit be made the nucleus of a permanent public health museum to be housed in some city in the Western Branch area. Your Association committee has offered its

aid to the committee of the Western Branch and the two committees will coöperate in activities looking to the development of a Museum of Hygiene in the West.

Other manifestations of interest have appeared in Philadelphia and Buffalo. In the latter city the Museum of Science has created a " Hall of Man " which was opened in the spring of this year. The exhibit which was brought from the German Hygiene Museum by the Committee on Scientific Exhibits of the American Public Health Association and shown at our Pasadena Meeting has been placed in the Hall of Man for permanent display.

In conclusion, your committee feels that with returning normal economic conditions even further developments of the museum idea may be expected. The committee therefore recommends its continuation.

VICTOR G. HEISER, *Chairman*
HOMER N. CALVER, *Secretary*
BERTRAND BROWN
LOUIS I. DUBLIN
SALLY LUCAS JEAN
EVART G. ROUTZAHN
C.-E. A. WINSLOW

Current Health Department Practices*

THE Association is constantly receiving requests for information concerning the status and practices of local health departments. These inquiries most commonly relate to personnel and budget. In an effort to meet this demand, in part at least, the Sub-Committee on Current Practices of Health Departments has secured clerical assistance whereby the data coming to the office of the Association through the City and County Health Conservation Contests are recorded on forms displayed in Figures I, II, III and IV.

This information is made available to health officers and others who may request it. The names of the cities and counties together with the years for which data are available appear on the list which follows.

* Report on the work of the Sub-Committee of the Committee on Administrative Practice.

Health Jurisdictions and Years for Which Data on Expenditures and Personnel Have Been Compiled

(Figures I and II)

x Cities for which information on expenditures and personnel is available through the card index file maintained by the Sub-committee on Current Health Department Practices in the Central Office.

State	*Jurisdiction*	*1930*	*1931*	*1932*	*1933*	*1934*
Arizona						
	Jerome		x			
	Phoenix					x
	Prescott	x	x			
	Yuma	x				
California						
	Alameda					x
	Fresno	x	x	x		
	Glendale				x	
	Lodi	x	x	x		
	Long Beach				x	
	Los Angeles			x	x	
	Oakland		x	x	x	
	Ontario	x	x			
	Palo Alto	x	x	x	x	
	Pasadena	x	x	x	x	x
	Pomona		x	x		x
	Redlands	x	x		x	
	Richmond	x	x	x		
	Riverside	x	x	x	x	x
	Sacramento	x	x	x	x	x
	San Francisco	x	x	x		
	San Jose					x
	Santa Barbara	x	x	x		x
	South San Francisco					x
	Torrance				x	

State	*Jurisdiction*	*1930*	*1931*	*1932*	*1933*	*1934*
Colorado						
	Denver	x	x	x		
	Pueblo	x	x		x	x
Connecticut						
	Greenwich	x	x		x	x
	Hartford	x		x	x	x
	Middletown			x		
	New Britain	x				
	New Haven	x	x	x	x	x
	Waterbury	x				x
	West Hartford		x	x		
Delaware						
	Wilmington	x	x		x	
Dist. of Columbia						
	Washington	x	x	x		
Florida						
	Bradenton	x	x			
	Miami Beach	x	x		x	
	Ocala	x	x	x		
	Tallahassee				x	
	Tampa	x	x	x	x	
Georgia						
	Albany	x	x			
	Athens	x	x			x
	Atlanta	x	x	x	x	x
	Augusta	x		x		x
	Brunswick				x	
	Macon	x	x	x		
	Rome	x	x			
Illinois						
	Aurora	x	x	x	x	
	Champaign	x				
	Chicago		x	x	x	
	Decatur	x	x	x	x	x
	Evanston	x	x	x		x
	LaSalle					x
	Peoria	x	x	x		
	Peru			x	x	
	Rockford					x
	Winnetka	x	x	x	x	
Indiana						
	Evansville				x	x
	LaPorte		x		x	
	Mishawaka		x	x		
Iowa						
	Boise	x	x	x		
	Burlington	x	x			
	Des Moines	x	x	x		x
	Dubuque	x	x			
	Fort Dodge		x			
	Washington					x
Kansas						
	Abilene	x	x			
	Arkansas City	x				
	Atchison		x	x		
	El Dorado	x	x			
	Emporia	x	x	x	x	
	Eureka	x				

State	Jurisdiction	1930	1931	1932	1933	1934
Missouri	Carrollton	x	x			
	Columbia				x	
	Hannibal	x	x	x		
	Independence	x	x			
	Joplin		x	x		
	Kansas City	x	x	x	x	
	St. Louis	x	x		x	
Montana	Billings		x	x		
	Bozeman		x	x		
	Helena		x	x	x	x
	Great Falls		x	x	x	
Nebraska	Lincoln	x	x	x	x	x
	Omaha	x	x	x	x	
New Hampshire	Berlin					x
New Jersey	Cliffside Park					x
	East Orange	x	x	x	x	
	Englewood				x	x
	Hackensack					x
	Maplewood	x	x		x	
	Newark	x	x	x	x	x
	Orange	x	x		x	
	Ridgewood	x	x			
	South Orange	x				
	West Orange	x	x	x	x	
New Mexico	Carlsbad	x	x			
	Roswell			x		
Nevada	Los Vegas				x	
New York	Albany		x	x	x	x
	Amsterdam	x			x	x
	Auburn	x	x	x		x
	Binghamton	x	x	x		x
	Buffalo	x	x	x	x	x
	Ithaca	x	x			
	Middletown	x	x	x		
	Newark					x
	Newburgh	x	x	x		
	New Rochelle					x
	Ogdensburg	x	x	x	x	
	Owego	x				
	Plattsburg	x	x			
	Queens	x		x	x	x
	Rochester	x	x	x	x	
	Schenectady	x	x	x	x	x
	Syracuse	x	x	x	x	x
	Utica	x	x	x	x	x
	Watertown	x	x	x	x	x
	White Plains	x				
	Yonkers	x	x	x	x	

State	*Jurisdiction*	*1930*	*1931*	*1932*	*1933*	*1934*
North Carolina						
	Durham	x				
	Greensboro	x	x	x	x	x
	Raleigh	x	x			
	Rocky Mount				x	
	Winston Salem	x				
North Dakota						
	Fargo	x	x			
Ohio						
	Akron	x	x	x	x	x
	Cincinnati	x	x	x	x	
	Dayton	x				
	Delaware	x	x			
	Elyria				x	
	Hamilton	x	x			
	Lakewood	x	x	x		x
	Lima			x		
	Marietta					x
	Marion	x	x			
	Middletown	x	x	x		
	Sandusky	x	x			
	Sidney	x				
	Springfield	x	x			
	Steubenville					x
	Toledo	x	x	x	x	x
Oklahoma						
	Blackwell					x
	Woodward	x				
Oregon						
	Medford	x				
	Portland	x	x	x		
	Salem	x	x			
Pennsylvania						
	Erie	x	x	x	x	x
	Harrisburg	x	x			
	Philadelphia	x	x			
	Pittsburgh	x	x	x	x	x
	Reading	x	x	x	x	x
	York					x
Rhode Island						
	Newport	x	x	x	x	
South Carolina						
	Charleston	x	x	x	x	
South Dakota						
	Huron	x	x			
	Mitchell	x				
Tennessee						
	Chattanooga	x	x		x	
	Clarksville	x	x			
	Johnson City					x
	Knoxville	x				
	Memphis	x	x			
	Nashville	x	x	x	x	x
Texas						
	Amarillo					x
	Austin	x	x		x	
	Beaumont	x	x	x		

State	Jurisdiction	1930	1931	1932	1933	1934
Texas (Cont.)	Corsicana	x				
	Dallas	x	x	x	x	x
	El Paso	x	x	x		
	Fort Worth	x	x	x	x	x
	Houston	x	x	x	x	x
	Jacksonville	x				
	Palestine	x				
	San Antonio	x	x			
	Sherman		x	x		
	Texarkana	x				
	Tyler					x
Utah						
	Logan					x
	Provo					x
	Salt Lake City	x	x	x	x	
Vermont						
	Springfield	x	x	x		
Virginia						
	Charlottesville		x			
	Fredericksburg	x	x			
	Norfolk	x	x			
	Petersburg	x				
	Roanoke	x	x	x	x	x
Washington						
	Bellingham			x	x	
	Spokane	x	x	x		
	Tacoma	x		x	x	x
	Walla Walla	x	x	x	x	
West Virginia						
	Beckley			x	x	
	Bluefield	x	x	x	x	x
	Charleston	x	x	x	x	x
	Princeton		x	x		
Wisconsin						
	Eau Claire		x			
	Kenosha	x	x			
	Milwaukee	x	x	x	x	x
	Oshkosh	x	x			
	Sheboygan	x	x	x		
	Shorewood	x	x			
	Wausau	x				

County Health Jurisdictions for Which Data on Expenditures and Personnel Have Been Compiled for the Year 1934

(Figures III and IV)

State	Jurisdiction	State	Jurisdiction
Alabama	Calhoun	California	Contra Costa
	Etowah		Los Angeles
	Morgan		Santa Barbara
	Tuscaloosa		San Bernardino
Arizona	Gila		San Joaquin
	Maricopa		Stanislaus
Arkansas	Monroe		

FIGURE III—CARD (FRONT) USED FOR RECORDING DATA CONCERNING EXPENDITURES AND PERSONNEL OF COUNTY HEALTH DEPARTMENTS

Name of Rural Health Unit or District:

Address: Street City State

Health Officer:

Population: (193) (193) (193) (193)

Remarks:

	193					193				
	Number of Employees		Expenditures			Number of Employees		Expenditures		
	Full-Time	Part-Time	Amount	Per Cap.	% of Total	Full-Time	Part-Time	Amount	Per Cap	% of Total
Health Officer										
Medical Personnel										
Nurses										
Sanitation Officers										
Other Personnel (Classify)										
Operating Expenses (Classify)										
Total										

Source of Support	193			193		
County						
State						
Federal						
Non-Official (List)						
Total						

FIGURE IV—CARD (BACK) USED FOR RECORDING DATA CONCERNING EXPENDITURES AND PERSONNEL OF COUNTY HEALTH DEPARTMENTS

	193					193				
	Number of Employees		Expenditures			Number of Employees		Expenditures		
	Full-Time	Part-Time	Amount	Per Cap.	% of Total	Full-Time	Part-Time	Amount	Per Cap.	% of Total
Health Officer										
Medical Personnel										
Nurses										
Sanitation Officers										
Other Personnel (Classify)										
Operating Expenses (Classify)										
Total										

Source of Support	193			193		
County						
State						
Federal						
Non-Official (List)						
Total						

State	*Jurisdiction*
Delaware	Kent
	Newcastle
	Sussex
Florida	Leon
Georgia	Glynn
	Jenkins
Iowa	Woodbury
Kansas	Lyon
Kentucky	Barren
	Fayette
	Jefferson
Louisiana	Caddo Parish
	DeSoto Parish
	Rapides Parish
Maryland	Kent
	Montgomery
	Washington
	Wicomico
Massachusetts	Southern Berkshire
Michigan	Allegan
	Barry
	Eaton
Minnesota	St. Louis
Mississippi	Lauderdale
	Leflore
	Lee
	Pike

State	*Jurisdiction*
Missouri	Buchanan
	Greene
New Mexico	Bernalillo
	Eddy
New York	Cattaraugus
	Columbia
	Westchester
North Carolina	Forsyth
	Moore
Ohio	Darke
	Delaware
	Lorain
Oregon	Jackson
South Carolina	Charleston
Tennessee	Davidson
	Hamilton
	Rutherford
	Shelby
	Sullivan
	Washington
Texas	El Paso
Virginia	Fairfax
Washington	King
	Spokane
	Walla Walla
	Yakima
West Virginia	Ohio
	Raleigh

Several very interesting analyses of the data have already been made and published in the *American Journal of Public Health.*

March Journal—A Central Information Service on Current Practices of Health Departments, by Joseph W. Mountin, M.D., presents the purposes of the Sub-Committee and summary tables on total and per capita expenditures in certain cities for health service during the 4 year period, 1930–1933.

May Journal—Specific Expenditures and Personnel of Official Health Agencies in Certain Cities, by Joseph W. Mountin, M.D., presents an analysis of per capita expenditures for the year 1933 by specific functions and an analysis of number of health department personnel employed according to professional classification.

July Journal—Analysis of Public Health Expenditures by Geographic Sub-Divisions, by W. F. Walker, Dr.P.H., presents total and per capita expenditures in certain cities by geographic sub-divisions of the United States. Also brings up to date 1934 (data added) table on total and per capita expenditures by population groups published in March issue of *Journal.*

October Journal—Public Health Expenditures in Selected Cities by Nonofficial Agencies, by James Wallace, M.D., and Louis Feldman, is an analysis of expenditures by nonofficial agencies reported in connection with the City Health Conservation Contests for the 5 year period, 1930–1934.

An effort is now being made to complete the information for the missing years and to expand the list to areas not entered in the Health Conservation Contests. The coöperation of the health officers in this undertaking is essential to its success.

JOSEPH W. MOUNTIN, *Chairman*

Refrigeration of Foods and Its Relation to Present-Day Public Health*

IN accordance with the suggestion of the previous Committee on Foods, your present committee has endeavored to trace recent developments in certain of the food industries with the purpose of evaluating these changes from the standpoint of their relationship to public health. The particular field chosen for our report is that of food refrigeration, a topic hardly capable of complete discussion in the limited time available, but worthy of attention because of its intimate association with the health and well-being of everyone.

Since the invention of the first compression refrigerating machine about 1834, the possibilities of refrigeration have become increasingly apparent, although wide usage of refrigeration facilities has been attained only within the past generation. Today we find refrigeration of paramount importance and a necessity from the standpoint of economics, health, and convenience. The diet of mankind has been materially improved both in variety and quality by refrigeration which enables the year-round consumption of foods from even the most distant countries at prices within reach of the great majority, despite seasonal harvests and long transportation.

Our country is more fortunate in respect to our major food supplies than are some others, such as Great Britain, which draws largely from overseas, but with the increase in uses for refrigeration an industry of great magnitude has developed in the United States to meet augmented needs of this nature. Sir Frank Smith, Secretary of the Department of Scientific and Industrial Research of Great Britain stated last September that the refrigerated space regularly required to transport England's food supplies was equivalent to a floating cold store 20 ft. high, 50 ft. wide and 20 miles long, and that the public cold storage on land amounted in addition to approximately half that content.

In comparison, using statistics presented recently by the American Institute of Refrigeration, the United States in 1931 had refrigerated warehouses which together would approximate a similar chamber 140 miles long, our 119,000 refrigerated freight cars adding 45.5 miles, our ships a further 22 miles, and the domestic mechanical refrigerators sold in the past 5 years another 4.8 miles. Thus we have as a nation a potential refrigerator for foods 50 ft. x 20 ft. over 200 miles in length (or greater than the distance from New York to Baltimore) exclusive of ice boxes in the homes, stores, and restaurants, and the 42 million tons of artificial ice produced during the same year in addition to tremendous quantities of natural ice.

In January, 1935, according to the U. S. Department of Agriculture, there were in cold storage:

Butter	23,587	tons
Cheese	51,098	"
Frozen eggs	32,439	"
Poultry	61,000	"
Meats	479,548	"
Fruits	31,384	"
Fish	34,672	"
Apples	8,890,000	barrels

* Report of the Committee on Foods.

During 1934 we exported 97,715 tons of refrigerated meats and over 544,000 tons of vegetables and fruits.

In 1912 a symposium was held by this Association during which the various aspects of cold storage relating to public health were discussed. At that time refrigeration, or cold storage of foods as it was then termed, was looked on with some suspicion by the general public. In this symposium the late Professor Sedgwick made the following statement:

In short, cold storage is one of the greatest boons mankind has ever known. From the sanitary as well as the economic point of view it is a blessing because it gives us a much greater variety of health-giving food than existed in the older days.

The passage of over 2 decades has amply verified this statement because there has been a great increase in the quantity of foods subjected to refrigeration, the number of products, and the extent to which each is so handled. The necessity for *continuous* refrigeration from the time of harvest or slaughter until consumption is becoming more clearly recognized. The precooling of products before shipment is now commonly practised by many shippers of fruits, vegetables, and other foods, who formerly felt it unnecessary. Careful attention in these respects has doubtless reduced spoilage which is a large factor in our more perishable food supplies.

Today, as was always the case, the refrigeration of foods should be considered as one of the very best means of food preservation, provided it is carried out under proper conditions. Refrigeration never has and never will make good foods out of poor ones, but, fortunately, this fact has become thoroughly understood. It is also evident that the public no longer looks askance at refrigerated foods, because otherwise no such expansion of this type of food handling as has taken place would have been possible.

The "cold storage" label required by law on foods subjected to refrigeration for any length of time has ceased to cast the stigma which in earlier years it sometimes attached to foods preserved in this manner.

Food refrigeration still needs and deserves proper supervision. Only foods of sound quality should be worthy of refrigeration, and such storage should be controlled as to duration, temperature, humidity, and other physical conditions. The various state laws concerning foods and food storage are effective only within their respective borders, while the inspection of all foods entering interstate commerce is vested in the Food and Drug Administration of the U. S. Department of Agriculture, which enforces the federal food and drug acts. The inspection of meats and supervision of packing-house products and cold storage of the same is under the jurisdiction of the Bureau of Animal Industry, and its regulations also apply to all products of this nature which cross state borders.

The quality and edibility of foods, and refrigerated foods as well, is dependent more upon their physiological or biochemical age, if such a term may be used, than on their chronological age. The physiological or biochemical age is dependent on the extent to which the processes of maturation in living materials—such as fruits and vegetables; and the catabolic enzymes contained in dead materials, such as animal products; plus the activity due to the bacteria, molds and yeasts they contain—have progressed, and the changes which have resulted therefrom. In other words, taking eggs as an example, an egg laid only a few days and improperly stored may be of inferior quality to another egg laid the same day but carefully and immediately cooled and maintained under optimum

conditions of refrigerated storage for several months. As time goes on and more is learned about such physiological and biochemical changes, it would seem that the more logical method for the determination of quality and edibility of cold storage products would be the evaluation of such changes, together with the direction of more attention to the preparation of such products for storage, and their actual storage conditions, rather than the emphasizing of storage time, or chronological age, which may sometimes be a fallacy. At present the different state laws concerning cold storage show a considerable divergence in respect to the time limits during which foods may undergo refrigerated storage.

Microbiological studies made on refrigerated foods indicate that not all microörganisms are equally susceptible to the effects of low temperature. Different foods provide media of widely varying chemical composition which influence the reproduction of microörganisms to a marked degree, as do also the temperature and the duration of refrigeration. Certain cold-tolerant types of microörganisms persist in spite of the most rigorous treatment. The usual refrigeration temperatures cut down the rate of reproduction and tend to reduce bacterial counts. At the lower temperatures this effect is more marked, but refrigeration should not be considered a means of sterilization. Refrigeration cannot be expected to be lethal to all food poisoning organisms, or to inactivate bacterial toxins; but it should retard the growth of pathogens and the production of toxins. The proper selection and preparation of foods for refrigeration, sanitary handling of the same, and constant refrigeration until they are used, should minimize hazards.

The sanitation of refrigeration facilities has been improved in recent years. The industry itself has voluntarily made many improvements which have raised standards to a higher level, although due credit must be given to those governmental agencies which have so capably supervised and encouraged such procedures.

Much attention has been paid of late to a study of the best conditions of storage for specific foods, particularly fruits, vegetables, and meats, and it has been found that optimum conditions of temperature and humidity differ to a considerable extent. The storage of foods in the presence of controlled atmospheres containing gases, especially carbon dioxide, has been found desirable in respect to fruits and meats and has recently come into use in English warehouses and ships.

In addition to refrigerated storage and transportation, which may be at temperatures above or slightly below the freezing point, there has been a vast increase in the freezing of foodstuffs. The last decade has seen the birth of a new industry which has already made its impression on the diet of many of our people, namely, that of quick-freezing as distinguished from the older methods.

Another closely allied innovation is the development of quick-frozen methods by which the consumer units of relatively small size can be frozen within the package. This processing of quick-frozen foods, which was first applied to fish, has been extended to many other food products, including practically all meats, shellfish, vegetables, fruits, and even corn on the cob. Certain of the vegetable products are subjected to a short blanching process or heat treatment previous to freezing, in order to inhibit enzyme action with its concomitant changes in color and flavor, and facilitate packing operations. These products even after storage for a number of months at refrigeration temperatures (usually 0° F. or lower) compare very closely in

flavor and taste with the fresh, thus products can be packed at their optimum condition of maturity and preserved in substantially that condition until consumed. This is not the case with many fruits and some vegetables, not frozen, subjected merely to storage at reduced temperatures in transit, as such products are often picked before full maturity.

It must be emphasized that frozen foods, like all other refrigerated foods, require *continuous* low temperatures to minimize the growth of microörganisms and the biochemical activity of enzymes. Unless low temperatures are maintained until the products are about to be used, spoilage will occur and health hazards may result. This is well known in respect to unrefrigerated foods, which may be kept only for limited periods, but it applies equally to those which have been refrigerated or frozen.

Quick-frozen products are now available in many sections of the country where refrigeration facilities at the lower temperatures given are available. The maintenance of such low temperatures for storage warehouses in many rural districts, in retail stores and homes, has been unusual in the past but appears to be on the increase due to this development. In the larger cities such facilities have become quite common.

Numerous workers have been concerned in recent years with the nutritive aspects of foods, particularly from the standpoint of vitamins, and certain of these researches have related to refrigerated foods in storage. More attention in this respect has been paid to fruits and vegetable products and their vitamin C content, because certain of them have attained marked popularity and increased consumption due in part to such content. Such evidence as is at hand indicates that refrigeration of foods containing vitamin C tends to conserve such content in comparison with similar products not refrigerated during storage, although periods of months may diminish the concentration in some foods unless very low temperatures are employed. No evidence that the other known vitamins are deleteriously affected by the use of low temperature has been presented. This applies also to frozen foods.

It is believed that during the past few years of reduced incomes the economies of refrigeration have enabled many families to obtain foods in the fresh form during off-seasons at a cost which might otherwise have been prohibitive, thus allowing better balanced and more complete diets which contribute to the health of the individual.

An example of economy due to refrigeration is the reported distribution to families on welfare of frozen meat produced by the emergency slaughter of food animals in the drought areas by government agencies. These animals, doomed to die of malnutrition otherwise, were conserved or salvaged. It is hoped that such products, helpful as they may be as a source of food, will not be considered by the consumers as representative of the high quality usually found in refrigerated products.

The applications of refrigeration in the food industries have increased markedly in the post-war years. Omitting the dairy industries, which are more properly the field of another committee, it is worthy of mention that refrigeration is now used extensively in bakeries, breweries, candy and chewing gum factories, canneries, food oil hydrogenation plants, cocoa manufacturers, gelatin factories, packing houses, yeast plants, and many others. In some cases the use of low temperatures is for physical reasons, but in large part it is for the conservation of prod-

ucts against spoilage and the possibilities of injury to the health of the consumer. Refrigeration has also been shown to be lethal for various insect pests including the European corn borer. It has also been found effective in killing the larvae of Trichinella spiralis which are the causative agents of trichinosis due to eating pork and its products.

Thus we may visualize refrigeration as one of the protective forces of our community which functions in large part unseen, although those who are observant may note warehouses at our docks and terminals, pre-coolers in the harvest regions, insulated and refrigerated freight cars and fast motor trucks—even tank trucks—display cases in our stores which have vastly improved the retail handling of perishable foods, and the vast army of domestic refrigerators in restaurants, hotels and homes which are of equal importance at the consumers end. More than 5,000,000 mechanical guardians of the home which maintain a constant low temperature have been sold in this country since 1930, giving some evidence of the reliance which our nation places on refrigeration. The use of such facilities will doubtless avoid many unfortunate cases of disease formerly caused by improperly handled foods.

There are evidences that such facilities might well be extended to include the refrigeration of some products not commonly refrigerated at present. Numerous outbreaks of food poisoning have been traced to cream-filled bakery products, some of which have caused deaths. Refrigeration is no substitute for cleanliness or proper materials and procedures in the manufacture of filled bakery products; *but it is recommended as a desirable type of storage for such ingredients as may not be heat treated in manufacture,* in transit, in the food shop, and last, but not least, in the home.

In summation, your committee views refrigeration as a faithful ally and servant to all food consumers, one which has become so intimately connected with our daily life and existence as to be practically indispensable. Like all servants, it requires proper and strict supervision. Fortunately, in this country, such supervision has been both adequate and capable with rare exceptions. The use and advantages of refrigeration bid fair to expand as time goes on, to the benefit of the health, comfort, and pocketbook of our nation.

Your committee recommends the continuation of the work of the Committee on Foods for another year.

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Standard Methods for Microbiological Examination of Foods

PROGRESS toward the standardization and simplification of the microbiological analyses of food products has been made along 3 lines, namely, for fermented foods, for meats and meat products, and for shellfish. In accordance with the policy of this committee, bacteriologists experienced in the analysis of these types of foods have been requested to assume the leadership in the development of methods for each product.

Dr. C. S. Pederson, who has long been interested in fermented foods, agreed to promote methods for sauerkraut, pickles and other fermented products. Inasmuch as there is now very little information available on the types of microörganisms present in fermented foods, following the report by Dr. Pederson presented at the American Public Health Association Annual Meeting in Indianapolis in 1933, it seemed advisable to arrange for a series of examinations in various laboratories of both known and unknown samples of fermented foods.

Accordingly, Dr. Pederson prepared an outline of the types of tests he considered important. This outline was submitted to all members of the committee and others who were in a position to make helpful suggestions. The comments of each reviewer have been carefully considered and every suggestion incorporated. With a brief introduction and with some sections expanded to greater detail, this outline will serve as the basis for the examination of test samples soon to be submitted to some 6 or 8 different laboratories.

These preliminary analyses will be made in order to secure information as to the microflora generally found in fermented foods. From such information the methods, culture media, etc., best suited to the needs can be selected. Such general examinations can serve also to acquaint the analysts with fermented foods, as well as with the methods of analysis.

The development of methods for the examination of meats and meat products has received an unexpected and gratifying stimulation. The Bacteriological Sub-committee of the Technical Meat Committee of the National Canners Association has been studying this problem for some time and has joined its forces with the American Public Health Association in order that the greatest progress can be made with the limited personnel available. This is encouraging indeed and it is hoped real progress can be made along this line during the coming year.

In the field of shellfish examinations the committee has been ably represented by Dr. A. C. Hunter, who some time ago was made referee for developing standard methods for the examination of all types of marine products. The Association has been very active in work on oysters, and Dr. Hunter has taken an active part in the conference and developmental work.

At this convention, the results of many thousands of laboratory examina-

* Report of the Committee on Microbiological Methods of Food Examination of the Food and Nutrition Section.

tions on oysters, as well as the results of conferences and questionnaires on methods have been presented. Among these was a discussion by Dr. Hunter of the shellfish report from the control viewpoint.

Many different types of culture media have been used by various bacteriologists for the cultivation of anaerobic bacteria. Beef muscle extracts, beef heart extracts, liver infusions, chicken broths, vegetable broths, etc., all including a small portion of the original plant or animal tissue, have been prepared, used and recommended.

Anaerobic bacteria play an important part in food preservation and food spoilage, so this committee is vitally interested in any and all progress leading toward a more simplified practice in microbiological technic.

An extensive study of the value of different types of culture media for the cultivation of anaerobic bacteria has has been carried out by Dr. L. S. McClung. He was particularly interested in thermophilic anaerobes, but his survey of various media and methods of producing anaerobic conditions briefly summarizes the information to date, so that his selection of a method which is generally satisfactory for the cultivation of anaerobic bacteria is significant. In his study, the sealing of culture tubes with agar proved the most satisfactory. It is simple, rapid, and does not make the tubes difficult to clean, which is a serious problem in large laboratories.

Coöperation in this committee's work has been enthusiastic and it is hoped real progress can be made during the coming year.

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Milk and Dairy Products

DURING the past 3 years the Committee on Milk and Dairy Products has endeavored to review the scientific literature on vitamin D milks and to discuss certain aspects of their production which are of direct concern to administrative health officials.

As a result of reported clinical studies on vitamin D milks, a large number of cities have permitted the sale of these products. In some instances, these vitamin D milks are subject to control by means of ordinances or regulations, but in other instances, the sale of these products is not regulated by specific legal requirements.

In previous reports, the committee has attempted to show the status of these milks under existing laws defining milk and milk products. To illustrate the confusion on this subject which still prevails, the U. S. Public Health Service Milk Ordinance, which has been adopted in about 600 communities, merely states that vitamin D milks shall be produced in accordance with standards and regulations prescribed by the health officer, which obviously means that there is and will be an unfortunate lack of uniformity in control of these important products.

In contrast to this may be cited the regulations adopted during the past year by the Board of Health of New York City, which require, among other things, that the source of vitamin D and the number of units per quart shall be stated upon the labels. On the other hand, Dr. Paul B. Brooks, Deputy Health Commissioner of New York State, has expressed the opinion[1] that "no statement as to the number of units per quart shall appear on the cap or label." Since all market milk sold in this state, outside of New York City, is subject to the regulations of the state, this viewpoint, if incorporated in official control standards, would set up conflicting requirements within the same state.

With regard to the labeling of vitamin D milks, there appears to be a divergence of scientific opinion as to the use of comparisons between the potencies of vitamin D, as expressed in units for the several milks, and their equivalents in cod liver oil. This subject deserves careful consideration, with due regard to the results of clinical investigations.

The present mode of commercial advertising of the various vitamin D milks often tends to confuse the consuming public, especially when improper emphasis is given to units or to the question whether a certain milk is produced by "natural" or "artificial" means, when the clinical evidence indicates that all of these milks when properly produced are antirachitic.

Uniformity of administrative control of vitamin D milks of all types is essential. A noteworthy step toward the achievement of uniform standards and requirements for these products has been the establishment of the Vitamin Section of the Drug Division of the Food and Drug Administration of the federal government. In view of the facilities available to this federal agency, it is to be hoped that effective and reasonable standards for vitaminized products may be promulgated. This agency is in charge of Dr. E. M. Nelson, who is the Chairman of the

Committee on Standard Methods of Vitamin D Bio-assay of Milk, of the Food and Nutrition Section of this Association.

In order to standardize more effectively the physical and mechanical aspects of irradiation as applied to milk and to define the product, a conference of technical experts was convened in July in New York City. This meeting was called at the suggestion of the chairman of your committee, in his capacity as a public health official, and held under the auspices of the Wisconsin Alumni Research Foundation. As a result of this significant conference, a permanent committee of physicists, research engineers, and biochemists was appointed to define irradiation, and to formulate specifications for the process. The committee has already prepared a preliminary report. This action is to be commended as a progressive accomplishment looking toward the more effective correlation of a widespread practice of great significance to control officials and to the public health.

The work of this committee should lead to the establishment of reliable irradiation technic and the equipment of machinery with suitable indicating and recording devices which will make possible the official enactment of satisfactory requirements, and will permit of effective supervision by routine inspection. These procedures are analogous to present standards for and inspection of the process of pasteurization.

PASTEURIZATION OF CERTIFIED MILK

The noteworthy application of a scientifically proven safeguard to public health was the approval during the past year of the permissive pasteurization of certified milk, unanimously voted by the American Association of Medical Milk Commissions at their annual meeting in Atlantic City in June, 1935.

Section 58 of the Methods and Standards for Certified Milk has been amended to read as follows:

> Certified milk must be produced strictly in accordance with the Methods and Standards, and when so produced it may be subsequently pasteurized, provided it is labelled on the bottle cap with the words "Certified Milk—Pasteurized" in addition to the other requirements for the capping and sealing of bottles as described in Section 44.

A new section (No. 59) says:

> Pasteurization of Certified Milk must be done on the farm where it is produced and under the existing state and local rules and regulations. Equipment used for the pasteurization of Certified Milk shall not be used for the pasteurization of any other grade of milk.

This important action has been highly commended in editorials in the *American Journal of Public Health* for August, 1935, and in the *Journal of the American Medical Association* for August 24, 1935. Two pertinent quotations from these significant editorials are of special interest.

In discussing the action at Atlantic City, the *American Journal of Public Health* states:

> It was pointed out at that time, and we agree, that the action taken in favor of permissive pasteurization was a landmark in the development of certified milk, an episode which is as significant to dairy science and to public health as was the institution of certified milk itself in 1893. Physicians and consumers who desire a clean and safe raw milk can still obtain it, but an even greater proportion of discriminating physicians and consumers who prefer that the best milk obtainable be pasteurized will at last be satisfied. Health officials will now have added reasons for recommending and advocating increased consumption of these certified milks.

The *Journal of the American Medical Association* states:

> Now that the producers of certified milk and the medical milk commissions have adopted permissive pasteurization there should be benefit to all interested groups. Physicians desiring the highest quality of pasteurized milk for their patients will be able

to prescribe pasteurized-certified milk; producers of certified milk will be able to offer their customers a pasteurized product; public health authorities will be aided in their program of universal pasteurization, and milk consumers will have a wider choice among desirable milk supplies.

Certified Milk—Pasteurized is already on the market in Boston, Cincinnati, Detroit, Miami, and Philadelphia, and plans are under way to distribute it in New York and other large cities after October 15, 1935.

Health officials should endeavor to facilitate the distribution and sale of certified milk—pasteurized, and where necessary should adopt new legislation or amend existing laws to conform to the present methods and standards for certified milk. This has already been done in a number of states and cities. Methods of pasteurization should be those already sanctioned by law or set forth in the U. S. Public Health Service Milk Ordinance.

COMPOSITION OF MILK

The composition of certified milk must conform to rigid standards, based upon the natural characteristics of the dairy animals and influenced by scientific control of the constituents of ration of the cow. In some instances standardization of certified milk was practised, but the system has been discontinued as inadvisable.

Competition for commercial supremacy in the sales of market milks has in recent years often been based on "deeper cream line." Frequently this has led to standardization, by removal of skim milk by the dairyman by several methods, which practices may and do lead to contamination and even adulteration. For these reasons, such methods should not be tolerated. Obviously, if certified milk, which is intended primarily for infant feeding, should not be subject to such manipulation, other grades of milk, which are even more extensively employed as such an important food, should not be altered in composition on dairy farms where chances of serious contamination are likely to prevail.

In a study of standardization of milk on the farm by Button and Perry,[2] the conclusion is reached that practices of siphoning and separating involve unsanitary features; that fore-milking or the removal of skim milk by siphoning or gravity is not economical due to the loss of butter fat; and that the daily variations in herd tests make it difficult for dairymen to standardize their products so that they will contain the desired butter fat content. Unsanitary methods and conditions and financial losses to dairymen are both directly and indirectly of public health concern. In the first instance the product is subjected to bacterial contamination, and in the second case the dairyman is handicapped in his ability to maintain proper methods and equipment.

Perusal of existing laws defining milk reveals that standardization of milk on the dairy farm is generally illegal.

MISINFORMATION ON MILK

Much misinformation on milk and milk products is distributed by various self-appointed consumer organizations. Bulletins and other publications of these groups frequently contain erroneous and prejudiced facts, which are not only unreliable for consumers and unfair to the industry, but reflect upon the skill and integrity of health officials. Such distorted and irresponsible material should be condemned.

CONCLUSION

This report emphasizes the progress which is being made in the official establishment of uniform, reasonable, and intelligent control of various important milk products; point out certain ill-advised practices in milk pro-

duction; and the necessity for the enforcement of existing laws.

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Food Fallacies and Nutritional Quackery*

THE popular appeal, through the press and commercial advertisements, of matters relating to food and health has elicited wide popularization, and dissemination of information developed by scientific investigations in the field of nutrition. As a result, we have become as a nation "food conscious." The great popular demand for information about foods and dieting, together with the erroneous idea in many cases that nearly every disease and ailment can be cured by some system or other of dieting, has offered an unusually attractive opportunity for exploitation. During the last few years there has been an increasing amount of publicity, and exploitation of false and harmful statements foisted upon the public by dietary quacks, faddists, and so-called nutrition "experts." Some of them may be honest, but ignorant and misguided enthusiasts and fanatics. Many of them, however, are fakers, so-called "doctors," with little or no recognized professional standing, motivated by personal gain, who have selected this fruitful field for preying on the public.

Notwithstanding the large amount of popular scientific knowledge available in nutrition, the successful preying on the public by faddists and quacks has assumed alarming proportions. Influenced by promises, fanciful appeals to fear, and suggestion, many choose the courses offered by the faddist in preference to the advice of reputable authorities. Unfortunately, a large proportion of the population is unable to discriminate between the claims of the charlatan or ignorant faddist and those of investigators whose scientific contributions and knowledge have gained for them the position of outstanding authorities. Even physicians, nurses, teachers, medical students, and dietitians are numbered among the victims. Aside from mulcting thousands who can ill afford it, the exploitation of these dietary notions is a menace to public health, causing serious injury as a consequence of relying upon these false dietary systems for alleviating their ailments instead of seeking the timely aid of reliable medical assistance.

The most common subjects of the appeal which these quacks make are food combinations and incompatibilities. Based on entirely false representations, vicious systems of dieting which do much injury are given in books and pamphlets sold under high pressure salesmanship.

One of the most common and extensively proclaimed nutritional fallacies is that proteins and starches are incompatible and should be separated into distinct and separate meals. Based largely on this idea a system of dieting has been developed and featured in books and syndicated newspaper columns. A monthly magazine is devoted to this system. It is maintained that because starches require an alkaline medium for their digestion and proteins an acid medium, an antagonistic effect is developed when both are taken

* Report of the Committee on Nutritional Problems.

together which seriously interferes with the digestion of each of these classes of foods. One can look in vain through the writings of authorities in textbooks and journals for any scientific experimental data in support of this idea. The proponents ignore the fact that a large proportion of our staple articles of food contain both starch and protein. Adherence to this system would necessarily eliminate from the diet practically all products made from cereals and grains, such as bread, crackers, macaroni, cakes, pastries, etc. It would also exclude potatoes, beans, peas, and many other important foods. The cereal grains, wheat, rye, barley, oats, and corn, range in their protein content from 9 to 12 per cent or higher, and contain also about 60 per cent starch. Rice contains about 7 per cent protein and upward to 80 per cent of starch. Beans and peas are rich sources of both protein and starch, containing from 20 to 25 per cent protein and 40 to 50 per cent starch. Chestnuts range from 9 to 10 per cent protein and 20 to 30 per cent starch.

This absurd system would ban the time honored combinations which for generations have been recognized as wholesome and healthful, such as meat and potatoes, bread and milk, bread and cheese.

Investigators and authorities in the field of nutrition are practically unanimous in the opinion that there is no incompatibility between starches and proteins in the diet.

> Faddists have hit upon the idea that we should not eat starches and proteins at the same meal because starch digestion is interrupted in the acid stomach, acid being essential to peptic or stomach digestion of proteins. This is a fallacy. There is no significance in this interruption. The cat, dog, and cow have no starch-digesting ferment in their saliva, but they thrive on foods rich in starches. All their starch digestion takes place after the food has left the stomach and reaches the small intestine. Nature did not put these animals at a disadvantage in this respect. *McCollum and Becker.*[1]

> Much of what is said by food faddists relative to combinations of protein and carbohydrate is fallacy without any basis in scientific study. *Fishbein.*[2]

It has been shown that a mixture of carbohydrate and protein foods is discharged from the stomach in shorter time than protein alone, indicating that

> . . . the addition of carbohydrate to the diet accelerates digestion and the discharge of the gastric contents. *Cannon.*[3]

Studies by Rehfuss, Hawk, and others[4] on human gastric digestion in the stomach involving more than 1,000 studies on 200 normal men, in which a great variety of protein and starch combinations was used, failed to produce any evidence whatever of the incompatibility of these 2 classes of foods. In order to meet criticisms of the food faddists, that different results would have been obtained had the studies been made with chronic invalids instead of normal individuals, Rehfuss[5] has more recently extended the investigations to include a cross-section of medical invalids representing almost every variety of chronic illness encountered in a medical work service. Meat was used to represent protein, and potatoes to represent starch. The results of these studies involving hundreds of observations and representing a year's work in medical service, again demonstrated:

> . . . the absolute inaccuracy of the statement that proteins and carbohydrates are incompatible in the stomach. . . . There is no evidence either in the literature or in my investigation to lead me to believe that proteins and carbohydrates are incompatible in the stomach. The danger of such teaching based on a lack of scientific evidence is manifest, and while it may be true that many individuals overeat and are presumably better by a reduction of carbohydrates, the unqualified acceptance of such a teaching can lead to the occurrence of serious malnutrition as well as to a lighting of tuberculosis and old infections.

We are also told to eat but one kind of starch at a time and one kind of protein. This is obviously so devoid of any scientific reason that it merits but a mere passing reference. All starches yield on digestion the same simple sugar, glucose. The end product is the same irrespective of the source of the starch. As to proteins, to eat one kind at a time is just what one should not do. Proteins differ in their nutritive value depending on their amino acid composition. Some proteins are lacking or deficient in certain amino acids which are nutritionally indispensable.

Nutritionally deficient or incomplete proteins should be supplemented with other proteins so that the amino acids lacking in the one will be supplied by the others in order to have an assortment of amino acids adequate to meet the requirements of the body. For example, the endosperm proteins of the cereal grains in general are deficient in lysine and tryptophane, two amino acids indispensable for growth and normal nutrition. The proteins of meat, milk, eggs, and nuts, on the other hand, are excellent sources of these amino acids. The value of the cereal proteins in the diet is enhanced by inclusion of the latter protein foods in the diet. Instead of an incompatibility we have a supplementation.

Acidosis is a term that is frequently and effectively used by the purveyors of food fallacies in the exploitation of their books, literature, and dietetic systems. Nearly all diseases that afflict mankind can be found enumerated as the result of acidosis caused by eating "acid foods." Elaborate menus are offered for "alkali-forming" meals, and systems of dieting which can be had by purchasing their books or enlisting their services and special courses. The claim that acidosis, with all its dire effects, will result from eating bread and meat or certain combination of foods, such as proteins and starches, or fruits and starches, is entirely unsupported by scientific evidence.

Acidosis is usually a condition attending certain diseases, such as diabetes or kidney diseases, involving a faulty metabolism of the body.

There is no evidence that a preponderantly acid diet is injurious.

That the body reaction remains practically unaltered even when a wide range of amount of acid or base is ingested has been pointed out by Henderson.[6]

McCollum and Hoagland[7] found that long continued excess of acid-forming elements in the diet did not lead to any apparent injury.

The Committee on Foods of the American Medical Association in one of its recent decisions states that

> . . . acidosis is a name for a morbid condition of diminution in the reserve supply of fixed alkali in the blood and body fluids. Most people have no conception of the true meaning of the word and are quite likely to confuse it with gastric hyperacidity or "acid stomach," or to conceive of it as "acid blood," a condition which would be incompatible with life. The term "acidosis" is so little understood that its use in any advertising except that restricted to the medical profession is misleading and consequently disapproved.

As stated by Stone,[8] the term acidosis has become a popular fancy.

> . . . The belief that acid-ash foods are responsible for a variety of common symptoms such as gastric hyperacidity, lassitude, biliousness, acid mouths, headaches, nephritis, and high blood pressure carries one far afield. . . . The importance of the acid-ash diet as a factor in the etiology of disease has been overestimated.

Mariott[9] believes that ". . . acidosis is a rare condition and there is no good evidence that the regular taking of large amounts of alkaline-ash foods is of any special benefit." In his experience there is no evidence ". . . that an alkaline-ash dietary

can effect the reduction of established arterial hypertension."

Arthritis is a disease which is commonly emphasized as resulting from improper food combinations and which readily yields to the particular dietetic system which is exploited. We are told to omit "acid fruits and vegetables"; to partake of only one type of food substance at a meal; to alter the acid-base balance of the diet; to use a low protein and carbohydrate diet. Carbohydrate restriction is based on a dietary rationale, the correctness of which has not been satisfactorily demonstrated by scientifically controlled experiments. The commonly so-called acid fruits, such as oranges, tomatoes, and grapefruit, contain weak organic acids which are easily oxidized in the body. These acids are chiefly present as salts of inorganic bases which are left in the blood as alkaline carbonates and really serve as available alkali to the body. The fallacy and inadequacy of these claims have been recently pointed out by Bauer.[10]

> One need make no conscious effort to maintain a basic diet in an arthritic person any more than in a normal one. . . . The prescribing of a low protein diet is a relic from the days when rheumatoid arthritis was confused with gout. There is no justification for the limitation of proteins in the dietary of a patient with rheumatoid arthritis. There are many reasons why it should be liberal.

Another fallacy which finds a prominent place in the armamentarium of the nutritional quack is that acid fruits should not be eaten at the same time with carbohydrate foods, including breads and cereal products, potatoes, squash, and sugars of every kind. These foods, we are reminded, require an alkaline medium for their digestion, and without the alkaline reaction of the saliva they would never be digested at all. This view ignores the well known fact that only a part of the carbohydrate digestion occurs in the mouth and stomach as a result of the action of ptyalin in the saliva, and that there are active amylolytic enzymes in the intestines where carbohydrate digestion proceeds to completion. In fact, starch digestion can proceed favorably in a medium that is practically neutral. The relatively small amounts of the weak organic acids in fruits can have little or no significance in any interruption of starch digestion in the stomach where the hydrochloric acid of the gastric juice is many times stronger than the fruit acids.

Emphasis is laid by "experts" and exploiters of preparations offered for sale on the claim that the use of common table salt is responsible for Bright's disease, cancer, tuberculosis, high blood pressure, and other diseases and ailments.

The surmise that salt has some relation to high blood pressure has influenced to some extent the treatment of this disease. However, the work of O'Hare and Walker[11] lends no support to such a view. No relation was found to hold between blood pressure and the chlorides of the blood and plasma, and no effect on the systolic and diastolic levels was observed during wide variations in the amounts (0.5 gm. to 4 gm. daily) of salt taken in high pressure cases without nephritis. McLester,[12] in a series of controlled observations with patients having hypertension, was unable to note any improvement when a so-called "salt-free" diet was used. He believes, however, that in cases of hypertension complicated with nephritis the salt intake should be restricted "to that contained in the food as it reaches the table." While the avoidance of large quantities of salt in the diet of patients suffering from certain diseases may be advisable, there is no evidence that salt in the quantities generally used in the diet results in the development of such

diseases as mentioned or is attended by any harmful effects.

We are told to avoid the use of dark meats or to limit our meat consumption to fish and fowl. The statement that white meat is less harmful than dark meat has no basis in fact.[12] This belief goes back to the days when gout was confused with other forms of arthritis, and that foods rich in purines yield uric acid with resulting gout, rheumatism, and acidosis. With the exception of the glandular organs, liver, sweetbreads, and kidneys, dark meat contains no more purine bases than does white meat. Fish and fowl contain as much, or more, uric acid-forming bases as beef, veal, lamb, and pork.[12]

It has been proved by numerous investigators [13, 14, 15, 16, 17, 18, 19] that the white of eggs is much less digestible when raw than when cooked. There is even evidence [20, 21, 22, 23] that raw egg white when fed to experimental animals will invariably produce toxic symptoms. Nevertheless, it is still not uncommon to find physicians and nurses prescribing raw eggs for invalids in the belief that they are more digestible and more easily assimilated than when cooked.

Among the dicta of faddists and food charlatans are many so fanciful and absurd that to the person of ordinary intelligence they need no refutation. As illustrations of such fallacies may be mentioned the following: Tomatoes cause cancer; meat makes one sensuous and belligerent; mixtures of incompatible foods explode in the stomach; fish is a good brain food; garlic "purifies" the blood; cream should not be eaten with lobster, strawberries or pickles; fish and celery should not be eaten together; "dead foods" should be avoided in the diet.

Many different systems of dieting and treatments are advocated for weight reduction, some of which are merely scientifically unsound; others are positively harmful and dangerous. Many, eager to conform to the current prevailing fashion of being slender, adopt short-cuts to reduction advertised by food promoters and those interested only in their own personal gains, have done themselves harm, bringing on weakness, nervous irritability, and anemia. Particularly to be deprecated is the use of salts and dangerous drugs. In reduction treatment the first consideration is curtailment of calorie intake, with the object of accomplishing a gradual loss of weight without sacrificing the amount of protein, vitamins, and mineral salts required for normal body needs, nor even of the calories needed as a source of energy for body temperature and for production of work. Many reducing menus are erroneously based on elimination from the diet of individual foods, such as potatoes, rice, cereal products, and butter. In order to assure an adequate balance of food factors essential for health and normal nutrition, it should be remembered that it is not the kind of food that should be restricted, but rather the quantity. As Mendel [24] has aptly stated, "Sanity in diet calls for moderation in eating rather than exclusion of any wholesome food. Even the slenderest persons need some energy for their daily undertakings."

It is only by a process of education that the public can be enabled to discriminate between the fallacies proclaimed by the food faddists and quacks, and the sound principles of nutrition established by reliable investigators. Public health officials are in an excellent position to render a great service in educating the general public along these lines, and in waging a concerted attack on the operations of these enemies of public health.

There is plenty of reliable literature available which can be effectively used in conducting such a campaign of education.

In addition to the references already cited in this report, there are given others [25, 26, 27, 28, 29, 30] which excellently cover the subject.

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Standard Methods of Vitamin D Bio-Assay of Milk

IT is obvious that the appointment by the Association of Official Agricultural Chemists of an associate referee, Dr. Walter C. Russell, to study the problem of a standard method for bio-assay of vitamin D in milk constitutes a duplication of effort in our two societies. Accordingly, your committee proposes to collaborate in so far as possible with the associate referee of the other association and to draw its own conclusions from the evidence which has been collected by one of us for joint information. The data already collected by Dr. Russell which will soon be considered by your committee independently pertain to the 5 following topics:

1. Duration of the test period
2. Method of feeding the milk, comparing the results obtained by incorporating the milk in the basal diet, with those obtained by feeding it separately from the basal diet
3. Suitability of basal diets for control animals which receive cod liver oil
4. Methods of preserving milk during the period of test
5. The suitability of a reference oil as a standard for comparison

It is planned to continue further collaborative work on all 5 of these items, and upon such others as appear to your committee to be pertinent. The bio-assay of vitamin D milk should obviously follow the principles of the method laid down in the United States Pharmacopeia, which became official on January 1, 1935.

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Pneumoconiosis

THE current use of a variety of classifications for the roentgenological appearances of silicotic lesions is making it difficult to correlate the results of a rapidly increasing number of observers. In South Africa, where silicosis is a product of a single industry, and where the problem is handled almost exclusively by a bureau of the government, the classification that has evolved is entirely adequate for their purposes; but in a highly industrialized country silicosis develops in a great variety of occupations. A diagnosis may be required of a physician in a plant, in a public health office, in a sanatorium, or in the physician's private office. Sometimes he may have had little experience in the interpretation of roentgenograms of the chest, and will be forced to lean heavily on the interpretation of a roentgenologist.

The legal aspects of the problem have placed grave responsibilities on the medical profession and have often been a source of embarrassment. Only the physician who has examined the subject has obtained an occupational history of an adequate exposure to silica dust, and has before him a suitable roentgenogram of the chest, should make the diagnosis of silicosis. The roentgenologist, not in possession of these facts, can merely state whether the shadows which he sees in a film are consistent with this diagnosis.

If objective terms descriptive of the type of pathological changes could be generally adopted, material progress would result. The clinician would not have to accept a diagnosis from the roentgenologist; general students of the disease would be able to correlate the findings of the various observers; and more accurate definition of roentgenograms would be available for medico-legal purposes. Roentgenograms of the chest, which are notoriously difficult to reproduce as illustrations, could be described in word pictures capable of interpretation in the light of the personal knowledge of the observer. An error in diagnosis need not necessarily be passed on to others not in possession of the original film.

With these obstacles in mind, a committee has been at work for the past 2 years preparing a tabulation of the various lesions of silicosis together with terms that attempt to depict the character of the shadows cast on an X-ray film by these lesions. This report is submitted to invite criticism, in the hope that the terms suggested, or others of a similar nature, will be generally adopted.

It should be distinctly understood that the tabulation which follows applies only to silicosis, that form of pneumoconiosis which results from the inhalation of dust with a high silica (SiO_2) content.* Other forms, like asbestosis, are excluded from this consideration because their pathology is essentially different from that of silicosis.

The tabulation contains two columns: On the left are the roentgenological appearances and on the right are the corresponding pathological lesions. There is further subdivision to

* Some of the non-siliceous components of certain industrial dusts seem to modify the pathological reactions, but the character of shadows cast by these modified lesions is not sufficiently defined at the present time to include them in the tabulation. Later, when more information has accumulated, certain other terms may have to be included.

HEALTHY LUNGS AND ADNEXA

Roentgenological appearances	*Histological appearances*
1. *Healthy lungs*—As defined by the N.T.A. Committee report.	1. Essentially the normal tissues of the vascular tree, the mediastinum, the bronchi, and trachea.
2. Irregular exaggeration of the linear markings, with possibly some beading confined to the trunks.	2. Cellular connective tissue proliferation about lymphatic trunks in the walls of vessels and bronchi. Beading may be due to various causes, as blood vessels seen end on, arteriosclerosis, minute areas of fibrosis in lymphoid tissues along the trunks.
3. Increased root shadow.	3. Cellular reaction in the tracheo-bronchial lymph nodes with extensions along afferent lymphatic trunks.

These changes come within normal variations when not accompanied by recognized organic disease.

SIMPLE SILICOSIS

4. *Nodulation*—Discrete shadows not exceeding 6 mm. in diameter, tending to uniformity in size, density, and bilateral distribution, with well defined borders surrounded by apparently normal lung shadows. The outer and lower lung fields characteristically show fewer nodules.	4. Circumscribed nodules of hyaline fibrosis located in the parenchyma of the lung. Occasionally some of these nodules may show microscopic foci of central necrosis.
5. Conglomerate shadows that appear to result from a combination or consolidation of nodulation usually with associated emphysema manifested by— a. Localized increased transparency of the lung with loss of fine detail b. Intensification of the trunk shadows by contrast. c. Depression of the domes with possible tendency toward individualization of the costal components of the diaphragm. d. Lateral view: Increase in the preaortic and retrocardiac space with exaggerated backward bowing of the spine. Widening of the spaces between the ribs may or may not be present.	5. The result of coalescence of discrete nodules; an area in which the nodules are closely packed and most of the intervening lung is replaced by more or less hyaline fibrous tissue. The lung architecture is partially obscured. No demonstrable evidence of infection. Emphysema is a compensatory dilatation of the air spaces with or without thickening of the septa.

describe the appearances of: (1) healthy lungs, (2) the uncomplicated silicotic lung, and (3) lung of silicosis with infection. The changes described under the first division are those compatible with a state of good health; and while they *may* be produced by the inhalation of relatively small amounts of silica dust, they are not sufficiently characteristic or advanced to substantiate a diagnosis of silicosis. Similar or identical appearances may also result from the inhalation of non-siliceous dusts, from certain infections, from cardio-vascular disease, and from certain other rare conditions. The changes involved are for the most part confined to the lymphatics and perilymphatic connective tissues and do not often affect the parenchyma of the lung. Since, by definition, silicosis is a disease characterized by nodular fibrosis in the parenchyma of the lung, these alterations, even when they may have been caused by inhaled silica, do not constitute a basis for a diagnosis

SILICOSIS WITH INFECTION

The characteristic appearances described under simple silicosis are modified by infection as follows:

6. Localized discrete densities and/or string-like shadows accompanying those of simple silicosis described above.	6. Strands of fibrous tissue, often along trunks and septa, with or without areas of calcification; indicative of "healed" infection.
7. *Mottling*—Shadows varying in size with ill-defined borders and lacking uniformity in density and distribution, accompanying simple silicosis.	7. a. Areas of broncho-pneumonia with or without caseation, *i.e.*, acute infection. b. Lobular areas of proliferative reaction with or without caseation, *i.e.*, chronic infection.
8. *Soft nodulation*—The nodular shadows described under simple silicosis, 4, have now assumed fuzzy borders and/or irregularities in distribution. The change may or may not accompany the simple mottling of 7.	8. Perinodular cellular reaction either exudative or proliferative in character.
9. *Massive shadows* of homogeneous density not of pleural origin symmetrically or asymmetrically distributed.	9. Extensive areas of fibrosis probably due to organized pneumonia of tuberculous or non-tuberculous origin superimposed upon a coexisting silicotic process. Outlines of normal structures may be partially destroyed.

of silicosis. The second group covers the discrete and conglomerate nodular fibrotic reactions of simple silicosis. The last group deals with silicosis complicated by infection. In the majority of instances the infecting organism is the tubercle bacillus, but the classification is sufficiently broad to include other types of infection. Certain criteria by which one attempts to differentiate various forms of infection will be discussed.

COMMENT

For the first group of appearances we have adopted the nomenclature of the National Tuberculosis Association Committee and described the lungs as *healthy* rather than as *normal*, as a perfectly normal adult human being is a great rarity. For a description of the roentgenological appearance of the healthy chest the reader should consult a paper by Pancoast, Baetjer, and Dunham in the *American Review of Tuberculosis* for 1927 (vol. 15, pp. 429–471).

As already mentioned under 2, *Irregular exaggeration of the linear markings with possibly some beading,* belongs in the healthy chest group even when found in persons with a history of considerable exposure to silica, for such changes are nonspecific in character and they do not involve the parenchyma of the lung. Silicosis as a clinical disease begins only when the lung proper is affected. Likewise, under 3, *Increased root shadow* may be of nonspecific origin and hence is not diagnostic. In the *early* stages of silicosis the mediastinal shadow may be widened, owing to the enlargement of the tracheo-bronchial lymph nodes from accumulated dust and cellular reaction to it; later, when specific fibrosis develops, the tissues generally contract and the nodes decrease in size. The changes described under 2 and 3 may be caused by many forms of irritation; if they are due to silica they are identifiable only by miscroscopic examination. They do not apparently interfere with respiratory function, and they are not of diagnostic significance.

The second group of changes is

limited to *simple silicosis* uncomplicated by demonstrable signs of infection. This condition is characterized by the presence of small, discrete nodules of fibrous tissue disseminated throughout the functional parts of both lungs. The lesions and the shadows cast by them tend to be spherical, hard, sharply defined, and vary in size from 2 to 6 mm. While the distribution is usually uniform throughout both lungs, the extreme apices and the outer portion of the bases are frequently uninvolved. In less advanced cases the nodules remain discrete and separated by air-containing tissue. Irvine has aptly compared the shadows observed in the roentgenogram of the silicotic lung to those cast by a tree. In the earliest stages, when the reaction to silica is confined to the perilymphatic connective tissues, producing an accentuation of the linear markings, the shadow cast is that of a leafless tree. As small nodules begin to appear in the parenchyma of the lung, the tree begins to bud and the shadow of its branches is less clearly defined. When the tree is in full leaf, the stage of advanced nodulation, the shadow of the branches is completely obscured. Previous classifications have been concerned largely with the degree of nodulation as determined by the size and number of the nodules in the lung. We will not attempt to deal with this problem here, but choose to leave the "stage" of the silicosis to the internist, who has physical findings as well as a roentgenogram at his command.

Number 5 deals with the *conglomerate shadows* of simple silicosis, which appear to develop from a combination or consolidation of discrete nodules. The resultant lesion and the shadow that it casts are often difficult to distinguish from the *massive shadows* of silicosis with infection, 9. It is generally assumed that conglomeration results from accidental overlapping and fusion of discrete nodules when they become very numerous; but since conglomeration is usually a localized affair and does not occur in the same position of the lung of every individual, it is logical to inquire why the nodules happen to fuse in one portion of the lung and not in others. Microscopic examination of the tissues from such areas reveals no evidence of active infection. The nodules seem to be much closer together than in other portions of the lung, they are less uniform in size; and they are usually embedded in a matrix of diffuse fibrous tissue having the same characteristic hyaline appearance as that forming the nodules themselves. It seems probable that conglomeration may have occurred because the portion of the lung in question was previously damaged by a localized inflammatory process occurring before or during the early period of dust exposure. Because the tissue was injured, more dust would tend to accumulate in the area, the nodules would develop irregularly and would frequently be very close together. The silica lodging in preëxisting granulation or scar tissue would exert its characteristic effect, and a diffuse hyalinization would result. This explanation for conglomerate reaction is at present hypothetical; proof will come from long continued serial roentgenographic studies of groups of persons exposed to silica dust and from the chance autopsy that may be obtainable. To differentiate *conglomerate shadows* from the *massive shadows* of infection, 9, reliance must be placed upon the absence of change in size and character of the shadows in serial films taken over an extended period, and upon the clinical findings in the case.

Emphysema is usually associated with far advanced silicosis and it is particularly liable to complicate conglomerate nodulation. It occurs in the

immediate vicinity of the conglomeration as a result of the distortion produced by contracting scar tissue; there is also a generalized "compensatory" emphysema found along the borders of the lung, particularly at the bases. The latter type is also common in far advanced generalized nodulation.

In the last group, *silicosis with infection*, are included all cases with detectable evidence of infection whether active or inactive. In this respect we depart from the South African procedure, which includes here only active infection. The difficulty of determining activity, particularly in the silicotic subject, is our chief reason for this arrangement.

Number 6 covers foci of healed infection. Identification of such changes depends upon the same criteria that are generally employed in otherwise normal individuals. In the silicotic subject the shadows usually occur upon a background of generalized nodulation, although in some cases there may be a distinct tendency toward excessive nodulation in the immediate vicinity of the scars left by the infection. Where the exposure to dust has been limited, the major evidence of nodulation may occur about the foci of healed infection with much less reaction in the remainder of the lung. The string-like shadows of healed fibroid tuberculosis are not difficult to interpret if they occur in the classical location, *i.e.*, in the upper third of the lung. In the lower lung they present a problem whose solution depends largely upon the experience of the roentgenologist.

The term *mottling*, 7, we have reserved to describe the shadows of infectious lesions in contradistinction to *nodulation*, which is restricted to those of the silicotic dust nodule. It is essential that this distinction be appreciated and recorded in the terminology. In tuberculosis, mottling is due to bronchogenic or aspiration foci of disease which exhibit a characteristic clustered arrangement. The lesions may be exudative (acute) or productive (chronic) in type; the difference will be registered on the roentgenogram by a mottling which is fluffy and ill-defined, or hard and sharply defined as the case may be. The distribution of the mottled foci, together with the presence of large foci of older disease interpreted as tuberculosis, and clinical and laboratory findings establish the character of the infection. Mottling due to chronic infection that has developed previous to or simultaneously with the relatively early periods of dust exposure may exhibit little or no effect from the inhaled silica for many years. In non-tuberculous broncho-pneumonias the large chronic foci are absent, and the disseminate mottling may involve different parts of one lung or of both lungs. In many instances the nature of the infection must be established by serial examination over considerable periods of time and by careful correlation with clinical and bacteriological findings.

Soft nodulation, 8, is a term that has been coined to describe a rather uncommon combination of silicosis with infection, usually tuberculous. The ordinary hard, sharply defined nodular shadows of simple silicosis, under these circumstances, appear to have enlarged and lost definition. Their borders are now fuzzy and blend imperceptibly with the surrounding lung structure. Such lesions generally occur in association with localized conglomerate shadows in the apex or other portions of the lung. Histologically the infection appears to have localized in and about preëxisting silicotic nodules so that each is surrounded by a zone of exudative or productive cellular reaction.

Massive shadows of homogenous density, 9, are cast by the areas of combined silicosis and infection, usually

chronic in nature. The two processes appear to have developed simultaneously, and unusual amounts of dust accumulate in the diseased areas. Generalized nodulation usually occurs throughout the remainder of the lungs. Pleural densities can be differentiated in stereoroentgenograms, and by over-exposure it often becomes possible to penetrate the extremely dense intrapulmonary areas and analyze their internal structure. Not infrequently cavities may be visualized that were completely overlooked with the usual technic. When due to tuberculosis, such lesions are often bilaterally symmetrical. If the process extends to the pleural surface, a tuberculous etiology is postulated, while other infections are more often deep-seated.

Histological examination of such lesions shows conglomerations of simple nodules embedded in masses of more or less perfectly organized granulation tissue. Often the fibrous tissue has undergone the same peculiar hyalinization that characterizes the interior of the silicotic nodule. Usually the outlines of the original lung architecture are completely destroyed. Manifestations of infection depend upon the nature of the process—if tuberculous, there will be foci of caseation and possibly small cavities. Calcification is not infrequent. If the process is inactive, the presence of fibrous tubercles which do not exhibit the hyalinization of silicosis may be present. The occurrence of giant cells is helpful. A partially organized nontuberculous pneumonia usually contains foci of acute exudation of variable size. Clinically such unresolved pneumonias frequently exhibit periods of exacerbation followed by regression. They may be due to a great variety of organisms, including the Friedlander group and oral anaerobes. Where all manifestations of activity have disappeared, the lesion is probably best classified as a conglomerate shadow of simple silicosis, 5.

The differentiation between these *massive shadows* of infectious origin and the conglomerate shadows of far advanced silicosis is difficult and not always possible. Repeated reëxamination of the patient for evidence of change in the roentgenographic appearance of the lesion, penetration of the massive areas by over-exposure to analyze its internal structure, the clinical behavior of the patient, and repeated bacteriological examination of the sputum may all be necessary to determine whether an active infection is present.

It is hoped that the suggested terminology will receive a practical test. If others find it usable, the advantage of standard descriptive terms should outweigh the conservatism of those who are already using classifications of their own.

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Skin Irritants*

THIS report is in the form of an annotated bibliography of some 782 papers or publications dealing with industrial skin irritants. This is a continuation of similar former reports and covers the period of 1929–1934 inclusive. There is a somewhat detailed discussion of the subject as developed in these papers, with an evaluation of the work as reported, and with an indication of the most interesting and important progress and of new developments in the field.

The bibliography is classified under the following heads:

1. General subjects, including statistical data, general prophylaxis, diagnostic tests and treatment, with special consideration of eczema, and of allergy or sensitization
2. Trade dermatoses
3. Physical irritants
4. Animal and animal product irritants
5. Plant and plant product irritants
6. Microörganisms
7. Inorganic chemical irritants
8. Organic chemical irritants
9. Industrial skin cancers and carcinogenic factors, with a number of papers presenting experimental studies on these lines
10. Medico-legal considerations

The bibliography is supplied with a completely cross-referenced author and subject index.

NOTE: The abstracts on which the report is based are filed (645 of them) in the office of the Committee Chairman in the Hygiene Department of the University of Pennsylvania and are available to interested members.

HENRY FIELD SMYTH, *Chairman*

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* Abstract of the Report of the Committee. The complete Report will be published by the U. S. Public Health Service.

Standard Practices for Compensation in Occupational Diseases

IN 1929 a preliminary report was submitted to the Industrial Hygiene Section, at Minneapolis, and was distributed in mimeographed form to members of the Section. This material was again revised and submitted to the Committee on Research and Standards, which approved the project for publication. By a grant from the Chemical Foundation, this was done in 1931 and made available to the general public.

This report consisted of a compilation of occupational disease legislation, covering Europe and the Americas. From year to year the committee has reported on the changes in occupational disease legislation, so that the original report of 1931 has been kept up-to-date by these supplementary reports.

In addition to this primary study, the committee collaborated with the Committee on Lead Poisoning in 1932, and the Committee on Pneumoconiosis in 1931, in the preparation of standard practices in the compensation for these two diseases.

The committee also prepared an extensive report on the definition of occupational disease in 1932 for the National Committee on Nomenclature.

While the primary objectives of this committee were to study and establish standard practices, it feels that it has achieved only the first of its two purposes. It was hoped that the compilation of occupational disease legislation would be utilized by legislative and social agencies, employees' insurance companies, as well as labor organizations who were interested in improving or changing existing legislation to conform with modern progress and standards. We have been disappointed. It would seem that all the data accumulated by our committee on existing laws, studies, surveys, bills, etc., over the past few years, have not been utilized by law making bodies. This may be seen in the perfect flood of bills that have been introduced in a number of states, all of which, with the exception of those in North Carolina, have disregarded established principles of occupational disease compensation. New York, for example, has passed a blanket occupational disease law which disregards the experience of many countries, like New Zealand, which has changed from a Blanket Law to a Schedule Law.

The failure of this committee to achieve its objective is not due to the nature of the material and reports, but to its make-up. This committee cannot hope to gain a hearing from legislative bodies unless it has the authority that comes from an enlarged representation. Without this it is futile for the committee to continue and it would be well for it to be dismissed. However, if this section feels that it is desirable to pursue this objective of establishing standard practices, it will be necessary to enlarge its representation to include the various interests involved—the employer, the worker, the government, the university, and other social agencies.

We request therefore that the committee be directed to make a preliminary report at the next meeting with a view to determining the feasibility of creating as a projecting aim of this committee and section a central agency representative of all groups in-

terested in the improvement of standard practices in the compensation for occupational disease. This central agency would concern itself with the promotion of education, legislation, research, and the creation of a panel of qualified medical and non-medical experts in industrial hygiene for medico-legal purposes.

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BERNARD S. COLEMAN
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Ventilation and Atmospheric Pollution

Part I

Ventilation and Atmospheric Pollution

THE following was approved by the committee and adopted by the Section on Industrial Hygiene at the Milwaukee Meeting as an outline of working standards for atmospheric and space environments for the maintenance of comfort, health, and efficiency, assuming altitudes not exceeding 10,000 feet above sea level *:

1. Cool rather than hot †
2. Dry rather than damp †
3. Still ‡ or moving depending upon physical activity †
4. Some diversity in temperature—time and space—rather than uniformity and monotony †
5. Foot level as warm as head level
6. Radiant source as an item in heating, preferred
7. Graded differences between air-conditioned quarters and outer air, depending upon the length of stay in-doors, *i.e.*, less difference for brief stays
8. Odor-comfort
9. Minimum area for adult person of 25 sq. ft. and cubitage of 200 cu. ft.
10. Reduction of obnoxious dusts, bacteria, fumes, vapors and gases to their sub-danger thresholds
11. Satisfactory primary sense impression upon entering the room or space
12. Maintenance of comfortable conditions during occupancy (room comfort impression)
13. Sufficient replacement of "foul air" with "fresh air" to meet odor-comfort rerequirements
14. Ionization and actinic ray effects on air itself to be disregarded for the present
15. Intelligent supervision

The items of compressed air, ultraviolet rays, X-rays, and radium exposures are not considered here.

EMERY R. HAYHURST, *Chairman*
PHILIP DRINKER
LEONARD GREENBURG
WILLIAM J. MCCONNELL
CAREY P. MCCORD

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* Agreements as to the majority of the exact specifications, of interest to engineers, were summarized in the previous report of this Committee (*Year Book*, A.P.H.A., 1934–1935, pp. 108–112).

† Adapted from the British Health of Munition Workers' Committee, *Memorandum No. 9*, 1916.

‡ "Still" implies air motion under 25 ft. per minute.

Part II

Standard Methods for the Examination of the Air

THE last report to the Association on Standard Methods for the Examination of the Air, known as the "Fourth Supplementary," was made at the New Orleans Meeting, October 27, 1919, by a committee consisting of C.-E. A. Winslow, *Chairman*, T. R. Crowder, W. P. Mason, E. B. Phelps, and C. G. Whipple.

At the Pasadena Meeting, in 1934, the Association Committee on Research and Standards referred to the Section on Industrial Hygiene the matter of bringing this subject up to date. Further instructions were that the Laboratory Section and the Public Health Engineering Section also name representatives for the purpose. Accordingly, the Section on Industrial Hygiene referred the matter to its Standing Committee on Ventilation and Atmospheric Pollution, the personnel of which is named in Part I. Through the good offices of the secretaries of the other named Sections, the two following gentlemen accepted invitations which completed the present committee: G. L. A. Ruehle, of the Food and Drug Administration, U. S. Department of Agriculture, to represent the Laboratory Section; and Harry B. Meller, Head, Air Pollution Investigation, Mellon Institute for Industrial Research, to represent the Public Health Engineering Section. For convenience, this newly constituted committee was named the "Special Committee on Standard Methods for the Examination of the Air."

The plan of procedure adopted was to divide the subject into 4 parts: Physical, Chemical, Dust, and Bacteriological. Specialists in these various fields were then sought and requested to draft the respective reports wanted.

The committee is especially indebted to the following gentlemen for reports on 3 of the 4 divisions (as submitted below):

C. P. Yaglou, Department of Industrial Hygiene, Harvard School of Public Health, Boston, Mass.

Warren A. Cook, Chief Industrial Hygienist, Connecticut State Department of Health, Hartford, Conn.

J. J. Bloomfield, Office of Industrial Hygiene and Sanitation, U. S. Public Health Service, Washington, D. C.

Their reports, it is believed, take up, by inclusion and references, the most immediately needed features and with a minimum of overlapping.

The fourth division—Bacteriological—has still to be drafted, and the committee hopes to be able to secure the services of a well known investigator to assume the task and present his report in time for the next Annual Meeting of the Association, to be held in New Orleans, 1936.

At the Milwaukee meeting (October, 1935), it was further decided to include the original drafters in the personnel of the committee and ask each to head-up a sub-committee to keep in touch with the developments in his special field and to report at intervals, as seems desirable. Comments and suggestions are invited, and may be taken up with any member of the committee as befits the subject matter.

EMERY R. HAYHURST, *Chairman*
HARRY B. MELLER
G. L. A. RUEHLE
PHILIP DRINKER
LEONARD GREENBURG
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Physical Procedures in Air Analysis

Instruments and Methods for Recording Thermal Factors Affecting Human Comfort

C. P. YAGLOU

1. Temperature: Mercury or alcohol thermometers capable of recording temperature within 0.5° F.
2. Humidity: Sling psychrometer
3. Air movement: Kata thermometer[1] or heated thermometer[2]
4. Radiation: Thermo-integrator[3, 4] or heated globe thermometer[5]
5. Combined effects of 1, 3, and 4, under conditions of minimal perspiration: thermo-integrator or heated dry globe thermometer
6. Combined effects of 1, 2, and 3 under conditions of maximal perspiration: effective temperature index[6] or heated wet-globe thermometer

Comfort in so far as heat or cold is concerned is associated with a normal heat balance between heat production and heat loss, at normal body temperature, and without sweating. Four of the basic factors affecting human comfort are air temperature, radiation, air movement, and humidity. No one of these is independent of the others, but their effects are quite different under conditions of minimal or maximal perspiration.

In men at rest under comfortable air conditions, the total metabolism remains constant, but the proportion of heat loss by radiation and convection may vary depending upon the external conditions. In still air, radiation accounts for about 45 per cent of the total heat loss, convection for 30 per cent, and evaporation for 25 per cent. About 11 per cent of the total heat loss takes place by evaporation from the lungs and 14 per cent from the skin. The former depends on the relative humidity, varying from about 12 per cent at 20 per cent R.H. to 9 per cent at 100 per cent R.H. Evaporation through the skin is limited to the output of water. Insensible perspiration is now believed to be chiefly a filtration of water from the capillaries, so that alterations in humidity may cause no alterations in water loss from the skin, except in so far as capillary pressure is affected by circulatory adjustments (Bazett, Phelps, Adolph).

Sweat gland activity is an emergency process which comes into play in warm environments, omitting psychic disturbances and the like. The output of sweat is controlled by temperature. With unlimited perspiration, the amount evaporated depends upon vapor pressure and air movement.

From this it is clear that in ordinary conditions the rate of heat loss from the body and the degree of comfort experienced depend largely upon the combined effects of radiation and convection.

The ordinary thermometer fails to give an indication of these effects because it is not sufficiently affected by radiation and little if any by air movement. A room may feel too cool at 75° or too warm at 60°, depending upon these radiation convection effects.

The effective temperature index also fails in this respect because it does not allow for radiation effects; it overestimates the influence of humidity at ordinary room temperatures; and it

underestimates the cooling effect of low air velocities.

The dry Kata thermometer is oversensitive to air movement while the wet Kata is oversensitive to both wet-bulb temperature and air movement.

Various instruments have been devised to register these radiation convection effects for the purpose of ascertaining the relative comfort of various environments and for studying the effectiveness of different methods of heating and ventilation. The principal ones are (a) Dufton's eupatheoscope,[7] (b) Vernon's globe thermometer,[8] (c) Winslow and Greenburg's thermo-integrator,[3, 4] and (d) Yaglou's heated globe.[5]

The eupatheoscope is an elaborate laboratory instrument designed especially for conditions prevailing in England. Modification is necessary for use in hot weather. It is not entirely suitable for routine measurements in the field, and the cost is quite high.

Vernon's globe thermometer is the simplest of all. It consists of a 6″ blackened copper sphere with an ordinary thermometer in the center. It is best suited to rooms heated by radiant methods. Its readings are sometimes misleading in rooms heated by convection methods. For instance, if the surrounding walls and glass are below air temperature, the globe will indicate in still air a temperature below that of the air, but if the air is set in motion the globe temperature will increase, approaching the temperature of the air as the velocity increases. Thus the cooler of the two conditions (that with high air movement) would give the higher reading on Vernon's globe. When the air and surrounding surfaces are at the same temperature, Vernon's globe records air temperature no matter what the velocity may be.

The thermo-integrator is a decided improvement over the eupatheostat with respect to both principle and operation. It consists of a blackened hollow copper cylinder 24″ long and 8″ in diameter, with hemispherical ends, containing an electric heating element of 21.5 watts (a storage battery furnishes the current). This is equivalent to a heat dissipation by the instrument of 17.5 B.t.u. per square foot per hour. Eight iron-constantan thermo-couples are distributed over the surface of the instrument, and the mean surface temperature is recorded automatically. This gives a valuable index of the radiation-convection condition of the environment to which the instrument is exposed.

The heated globe thermometer consists of 2 or 3 hollow spheres, one inside another, with air spaces in between to simulate the air spaces in between the clothing of a man. The outer sphere is a blackened standard 6″ tank float. The innermost sphere contains a heating element of variable resistance suitable for connection to the ordinary lighting circuit. The heat input is kept constant for any particular scale, but the amount can be varied by adjusting the resistance from a minimum of 15.3 B.t.u. per sq. ft. per hr. for men at rest, to a maximum of 75 B.t.u. or more for men at work, thus giving a variety of scales for various rates of work. During the heating season the electrical input is at the rate of 15.3 B.t.u./sq. ft./hr. for men at rest, and the surface of the outer sphere is kept dry. In summer the heat input is increased to 20.5 B.t.u./sq. ft./hr. and the lower half of the globe is moistened by fitting on a knitted woolen cap with a tassel which dips into a small bottle of water. When physical work is done at a rate which induces general sweating, the whole surface of the globe must be covered with a wet cloth and the electrical input increased to correspond with the total metabolism. An ordinary glass thermometer inside the outer

air space of the instrument registers a temperature comparable to that existing in the human body between the two outer layers of clothing. The readings of such a globe thermometer seem to be closely related to sensations of warmth and comfort induced by various air conditions.

A single 6″ heated globe with a thermometer close to the inner surface of the wall is as good as a triple globe for physical records of the intensity of radiation and convection. A cadmium plated cylindrical heater ⅜″ in diameter by 1½″ long, slipped over the bulb of an ordinary glass thermometer, is used as an anemometer by means of which air movement may be determined within ±¼ ft. per min.

How valuable the thermo-integrator or heated globe may be as a measure of atmospheric comfort remains to be seen. All four instruments apply during the heating season when the usual changes of humidity exert but a minor rôle upon comfort and sensations of warmth. Under conditions of sensible perspiration it would be desirable to retain the effective temperature index, at least for the time being, for it is difficult to reproduce the surface wetness of clothing and exposed skin by the addition of a moist covering to any of the four devices described.

DESIRABLE AIR CONDITIONS

The test for adequate air conditions should be the comfort of the individual, his psychological and physiological reactions to the conditions, and, last but not least, his inclination for work. No single comfort standard can be fixed to meet every purpose. The requirements differ according to the state of health, sex, age, clothing, activity, and degree of acquired adaptation.

For persons at rest or in sedentary occupations, the air conditions shown by the comfort zones of the A.S.H.V.E.[9] will generally prove satisfactory, provided a correction is made for radiation-convection effects, whenever necessary, by the use of the thermo-integrator or the heated globe thermometer. Such a correction may be made by using the radiation-convection temperature shown by the heated globe thermometer instead of the dry bulb temperature in computing the effective temperature.

For men at work definite standards for physical air factors are almost impossible to establish owing to the chang-

TABLE I

METABOLIC RATES OF MEN IN VARIOUS TRADES AND PROBABLE EFFECTIVE TEMPERATURE REQUIRED FOR COMFORT

	B.t.u. per Hour	*Authority*	*Probable Desirable Effective Temperature for Comfort* [10, 11, 12]
Seated, at rest	384	A.S.H.V.E.	*66* *
Tailor	482	Becker and Hamalainen	65
Bookbinder	626	Becker and Hamalainen	64
Shoemaker	661	Becker and Hamalainen	63
Carpenter	762–963	Becker and Hamalainen	62–58
Metal worker	862	Becker and Hamalainen	59
Painter (of furniture)	876	Becker and Hamalainen	59
Man sawing wood	1,797	Becker and Hamalainen	42
Maximum exertion	3,333 to 4,762	Henderson and Haggard	?

* Value holds for comfort during the heating season. In summer the probable comfortable E.T. varies from 68 to 75 E.T. depending upon prevailing outdoor temperature and conditions of exposure.

ing character of the requirements, particularly with respect to the type and rate of work, type of occupancy, duration of exposure, clothing, adaptation, etc. Each industrial process presents its own factors. The manufacturer should study and regulate conditions so as to bring about maximum comfort and work output.

A suggested schedule of desirable air conditions in various trades is given in Table I on the basis of total metabolism during work. The values are rough estimates indicative only of the extent of the variation in the requirements of industrial workers.

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Chemical Procedures in Air Analysis

Methods for Determination of Poisonous Atmospheric Contaminants

WARREN A. COOK

THERE is at this time no central source of information readily available on methods of determination of air-borne poisons. The only treatise on this subject appears to be a Russian publication of 188 pages, *Methods for the Determination of Obnoxious Gases and Vapors in the Air,* by A. S. Zhitkova, which appeared in 1934. An English translation has been made of this but it has not yet been made generally available. Although its bibliography refers, with a few exceptions, to Russian authors, and the author had apparently little access to recent American literature, this publication has a definite value.

Information on the determination of obnoxious materials found in the atmosphere is scattered throughout a variety of books, journals, and reports. Many of the published methods do not include collection of the material from the air nor discussion of the application of the methods to specific conditions.

A comprehensive work on the subject of determination of poisonous atmospheric contaminants may well be undertaken, it would seem, by the standing Committee on Ventilation and Atmospheric Pollution whose reports should present the consensus of opinion of those actively engaged in the field. Approach to this task by a sub-committee appointed for the purpose seems therefore especially desirable. The subject is dynamic, papers being constantly published on new or improved methods. At this time when great interest is being evinced in this field, it also seems desirable to correlate the available methods to the end that more reliable work can be done, that results of various interested investigators may be comparable and that re-duplication of effort in the development of new methods may be avoided.

Such a sub-committee's work may well be directed along the following lines:

1. The preparation of a list of the more common poisonous atmospheric contaminants together with satisfactory methods for the determination of them in the air, and original references to these methods
2. The preparation of a list of the toxic thresholds of these materials under varying conditions of time and concentration
3. The preparation of a list of those injurious materials for the determination of which new or improved methods should be developed
4. The preparation of an annual annotated bibliography of the literature on the subject
5. The collection of information from those actually using the various methods to ascertain their reported reliability for various applications
6. The affording of a means of exchange of information and experience among those working in the field
7. The stimulation of further research in the whole field on a broader and firmer basis

The present report is limited to a brief discussion of the first item in the above outline, viz., methods for the determination of the more common inorganic toxic materials to which workers are exposed.

METHODS AVAILABLE FOR THE DETERMINATION OF POISONOUS ATMOSPHERIC CONTAMINANTS

The types of methods which are of greatest utility are those which permit obtaining the result at the time and place of the determination without recourse to the laboratory. Methods of this type are principally those based on physical and physico-chemical phenomena. Those which have the widest use are (1) the portable interferometer, (2) combustion apparatus, usually depending upon catalytic combustion, (3) adsorption on solid materials such as activated charcoal and silica gel, (4) apparatus dependent upon the thermal conductivity principal, (5) methods based on refractive index, (6) micro-chemical methods, (7) spectroscopic methods, and (8) electroscopic methods.

Most of the above methods are applied to the determination of gases and vapors in air. Portable equipment based on the principles of interference of light, catalytic combustion, and thermal conductivity are now manufactured and may be applied to a wide variety of vapors and gases. While further developmental work should be conducted on certain of the applications of these instruments, these and other physico-chemical appliances possess the advantages of being less laborious than chemical methods, of frequently permitting immediately available results, and of enabling the plant engineer himself, in many instances, to obtain the desired information. The major disadvantage of most of the above methods is that they are not selective for any one of a mixture of gases or vapors but show the sum of all present. However, the information concerning the total concentration of a gas or vapor is often sufficient to serve as a basis for judgment of the presence and extent of the health hazard presented. Where more specific information is required, as to the concentrations of one of several gases or vapors, chemical methods must usually be employed. Chemical methods are also more generally applicable to solid materials in the air.

CHEMICAL METHODS

The determination of injurious materials in air by means of chemical methods usually involves three steps: (1) A satisfactory method of collection of the material, (2) the separation of the material from interfering substances, and (3) an appropriate procedure for determining extremely minute quantities.

COLLECTION OF THE SAMPLE

Since the amount of the injurious material in the air is usually very small, the method of collection of the sample usually involves passing a large volume of air through an apparatus which retains the material to be analyzed. Since the impinger apparatus (described by Bloomfield in another section of this report) samples air at the high rate of 1 cu. ft. per min., this device is of value where it is shown that it collects the injurious materials with the necessary efficiency. Even where gas sampling bottles of the most efficient types are used, it is desirable to conduct laboratory tests to determine their efficiency at a given sampling rate before using them in the field. This caution may also be suggested in the use of all methods for determining atmospheric constituents.

METHODS OF DETERMINATION

A list of the more common inorganic atmospheric contaminants is appended together with references to methods for their determination in air. Many of these methods have been actually used for making field determinations and have been found to be satisfactory by the writer; others of the methods are

suggested in authoritative literature and are believed to be reliable. It is urged that the use of these methods be subjected to laboratory tests for a given situation before employing them. In due time this committee aspires to give the most satisfactory methods a formal approval.

Material	*Method of Collection*	*Method of Determination*
Oxygen	Take sample of air in gas collecting pipette.	Absorb oxygen in Fieser's solution (alkaline hyposulphite with anthra-quinone-betasulphonic acid). Reference: *J. Am. Chem. Soc.*, 46:2639, 1924.
Ozone	Pass air through alkaline potassium iodide solution in gas wash bottles.	Acidify with sulphuric acid and titrate the liberated iodine with 0.01 normal thiosulphate solution. This method specific only in the absence of chlorine. Reference: Flury, F., and Zernik, F. *Schädliche Gase, Dampfe, Nebel, Rauch- und Staubarten.* Julius Springer: Berlin, 1931, p. 116.
Chlorine	Pass air through o-tolidine reagent in absorption tube described by Porter.	Transfer sample to Nessler tube and compare color with standards after standing for at least 2 minutes. Reference: Porter. *J. Indust. & Eng. Chem.*, 18:730, 1926.
Bromine	Pass air through potassium hydroxide solution in bubbler.	Determine the bromide as silver bromide. Reference: Flury and Zernik. *Schädliche Gase*, 1931, p. 123.
Iodine	Pass air through freshly prepared 10% potassium iodide solution in bubbler.	Titrate with standard thiosulphate solution. Reference: Flury and Zernik. *Schädliche Gase*, 1931, p. 124.
Hydrochloric Acid	Pass air through glycerol-potassium carbonate-water solution of the ratio 1:1:1.	The chloride ion is determined by the Volhard method. Reference: Heller, A. Determination of Hydrochloric Acid in the Air. *Gesundheits-Ingenieur*, 55:261, 1932. *Chem. Abst.*, 27:155 (Jan. 10), 1933.
Hydrofluoric Acid	Pass air through gas wash bottles containing potassium hydroxide solution.	Distil fluorides as hydrofluosilicic acid. Determine fluorides in distillate by titration with thorium nitrate solution using sodium alizarine sulphonate as the indicator. Reference: Willard and Winter. *Indust. Eng. Chem.*, Anal. Ed., 5:7, 1933; Boruff and Abbott, *Ibid.*, 5:236, 1933.
Sulphur Dioxide	Pass air through gas wash bottles containing measured volume of standard iodine solution in potassium iodide to which starch solution has been added. Stop sampling before purple color is entirely removed.	Titrate remaining iodine with standard thiosulphate solution. Reference: Adaptation from Fieldner *et al. J. Indust. & Eng. Chem.*, 11:519, 1919.

Material	*Method of Collection*	*Method of Determination*
Sulphur Dioxide (Cont.)		A detailed account of the iodimetric method given in following reference: Griffin and Skinner: Small Amounts of Sulfur Dioxide in the Atmosphere I. Improved Method for Determination of Sulfur Dioxide When Present in Low Concentration in Air. *Indust. Eng. Chem.*, 24:862, 1932.
	Aspirate the air through an absorber containing hydrogen peroxide and sulphuric acid in an automatic apparatus.	Analysis of samples which are automatically transferred to sample bottles by means of the iodimetric method. Reference: Thomas and Cross. Automatic Apparatus for the Determination of Small Concentrations of Sulfur Dioxide in Air. *Indust. Eng. Chem.*, 20:645, 1928. Thomas and Abersold. Part II of above. *Ibid.*, Anal. Ed., 1:14, 1929. Thomas. Part III of above. *Ibid.*, 4:253, 1932.
Hydrogen Sulphide	Aspirate air through a glass tube containing sensitized granules of activated alumina coated with silver cyanide or lead acetate.	The concentration is indicated by the length of travel of the color change on the granules with a given volume of air sampled or by the volume of air required to produce a standard length of travel. Reference: Littlefield, Yant, Berger. A Detector for Quantitative Determinations of Low Concentrations of Hydrogen Sulfide. U. S. Bureau of Mines, *Report of Investigations No. 3276*, June, 1935.
	Collect sample as given under iodimetric method for sulphur dioxide.	Determine hydrogen sulphide according to method given by Griffin and Skinner for sulphur dioxide.
Sulphuric Acid	Pass air through gas sampling bottle containing sodium hydroxide solution.	Acidify sample with hydrochloric acid and precipitate sulphates with barium chloride.
Sulphur Chloride	Conduct air slowly through a gas washing bottle containing a nitric acid solution of silver nitrate.	Dissolve the precipitated silver chloride in ammonia and again precipitate with nitric acid. Reference: Flury and Zernik. *Schädliche Gase*, 1931, p. 147.
Ammonia	Pass air through sulphuric acid solution in gas wash bottle.	Determine ammonia by A.P.H.A. Standard Method. Reference: A.P.H.A. *Standard Methods for the Examination of Water and Sewage.* 7th ed., 1933.
Nitrous Oxide	Pass air through sodium hydroxide solution in gas washing bottle.	Determine as nitrite in accordance with A.P.H.A. Standard Method. Reference: *Ibid.*
Nitrogen Oxides (Mixture of various oxides of nitrogen, principally NO_2 and N_2O_4)	Pass air through sodium hydroxide solution in gas wash bottle.	Oxidize with hydrogen peroxide and determine nitrates by A.P.H.A. Standard Method. Reference: *Ibid.*
Nitric Acid	Pass air through sodium hydroxide solution in gas wash bottle.	Method of determination similar to above.

Material	*Method of Collection*	*Method of Determination*
Phosphine	Pass air through gas washing bottle containing bromine water or through solution of sodium hypochlorite or bromite.	Expel the bromine. Determine as phosphoric acid. Reference: Flury and Zernik. *Schädliche Gase*, 1931, p. 171.
Phosphorus Trichloride Phosphorus Pentachloride Phosphorus Oxychloride	Pass air through 20% sodium hydroxide solution in gas wash bottle.	Determination of the dissociated chlorine (inexact on account of hydrolysis in the air). Reference: Flury and Zernik. *Schädliche Gase*, 1931, p. 172.
Arsine	Pass the air through silver nitrate solution in gas washing bottle.	Titrate the resulting arsenious acids. Reference: *Ibid.*, p. 179.
	Other methods of analysis are critically discussed by Joachimoglu, *Arch. f. Exper. Pathol. u. Pharmakol.*, 85:32, 1919.	
Carbon Monoxide	The method of choice for low concentrations is that depending upon the combustion method in which Hopcalite is used as the catalyst. The concentration of carbon monoxide is read directly from the dial of a milliammeter calibrated to read in parts per million of carbon monoxide. For higher concentrations the "Hoolamite" detector depending upon the color change produced by liberation of iodine from iodine pentoxide is a convenient method.	
	Collection of sample of air in a gas pipette.	The sample of air is passed through a tube containing iodine pentoxide at 300° C. and the liberated iodine is passed into potassium iodide solution. The iodine is determined by titration with standard thiosulphate solution. Reference: The many methods and references on carbon monoxide determination can be completely handled only by a more extensive treatise.
Carbon Dioxide	Pass air into gas washing bottle containing dilute barium hydroxide solution.	Titrate with dilute hydrochloric acid or oxalic acid using phenolphthalein as an indicator. References: Fieldner *et al.* *Indust. Eng. Chem.*, 11:519, 1919.
Phosgene	Air is passed through gas washing bottles containing 50 c.c. alcoholic sodium hydroxide, prepared by dissolving 40 g. sodium hydroxide in 125 ml. of distilled water and adding the solution to 875 ml. of 95% ethyl alcohol.	Neutralize with nitric acid (approximately normal), using phenolphthalein as an indicator, and the chloride ion is determined by titration with 0.1286 N silver nitrate using sodium chromate as an indicator. 1 ml. of 0.1286 N silver nitrate equals 1,000 p.p.m. phosgene (by volume at 25° C. and 760 mm.) for a 1 minute sample. Reference: *Ibid.*, p. 523.
Cadmium or Cadmium Compounds	Impinger device using water as the liquid.	Precipitate the cadmium as the sulphate and determine gravimetrically. Reference: Treadwell-Hall. *Quantitative Analysis.* Precipitate with hydrogen sulphide, dissolve, remove acid by evaporation, treat with KCN solution and some H_2S water. The color of the precipitate is then compared with that of similarly treated standard solutions under ultra-violet light.

Material	*Method of Collection*	*Method of Determination*
Cadmium or Cadmium Compounds (Cont.)		Reference: Fairhall and Prodan. Colorimetric Determination of Minute Amounts of Cadmium. *J. Am. Chem. Soc.*, 53:1321, 1931.
Mercury	Mercury vapor may be determined by means of the Nordlander Apparatus in which air at 70° C. is impinged against paper coated with selenium sulphide (dry). The concentration of mercury vapor is determined by comparing the degree of darkening of the yellow selenium sulphide with that of a standard paper.	Reference: *Indust. Eng. Chem.*, 19:522, 1927.
	Passing air through liquid air trap for condensation and collection of mercury.	Electrolytic deposition of mercury. Final estimation of amount of mercury recovered by measuring size of mercury sphere by means of the microscope.
	Absorption of mercuric bromide, produced by reaction of mercury vapor with bromine, in water.	Reference: Stock and Cucuel. Determination of Mercury Content in Air. *Ber. d. deutsch. chem. Gesellsch.*, 67:122, 1934.
	The above methods were developed for the determination of mercury vapor.	
	The vapor is collected by a freezing method using solid carbon dioxide.	Electro deposition of the mercury and micrometric determination similar to that described by Stock.
		Reference: Fraser. The Determination of Mercury in Air and in Urine. *J. Indust. Hyg.*, 16:67, 1934.
Lead	Impinger device with either water or dilute nitric acid as the liquid.	Precipitation of the lead as the sulphide and final estimation as the chromate.
		Reference: Fairhall: Lead Studies I. The Estimation of Minute Amounts of Lead in Biological Materials. *Ibid.*, 4:9, 1922–23.
		Precipitation of lead as the sulphide and final estimation as the chromate.
		Reference: Kehoe, Thamann, and Cholak. On the Normal Absorption and Excretion of lead. I. Lead Absorption and Excretion in Primitive Life. *Ibid.*, 15:257, 1933.
		Reference: Cholak. Quantitative Spectrographic Determination of Lead in Biological Material. *J. Indust. & Eng. Chem.*, Anal. Ed., 7, 5:287–290 (Sept. 15), 1935.
Chromic Acid	Impinger device with approximately normal sodium hydroxide as the liquid.	Determination of the chromate iodimetrically.
		Reference: Bloomfield and Blum. Health Hazards in Chromium Plating. *Pub. Health Rep.*, 43:2330, 1928.
		The chromate may be determined with semi-diphenylcarbazide as the indicator.
		Reference: Cazeneuve, P. *J. de pharm. et de chim.*, 12:150, 1900; abstr. in *Analyst*, 25:331, 1900.
Radioactive Substances	Methods of determination of radioactive substances in the air together with references supporting these methods are given in the following papers describing an extensive research conducted by the U. S. Public Health Service.	References: Schwartz, Knowles, Britten and Thompson. Health Aspects of Radium Dial Painting I. Scope and Findings. *J. Indust. Hyg.*, 15:362, 1933. Bloomfield and Knowles. II. Occupational Environment. *Ibid.*, p. 368. Ives, Knowles, Britten. III. Measurements of Radioactivity in Workers. *Ibid.*, p. 433.

Dust Procedures in Air Analysis

The Sampling and Analysis of Industrial Dusts

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THE subject of the health of workers in dusty trades has been receiving considerable attention from students of industrial hygiene and others interested in the various phases of this problem. When one realizes that the workmen employed in the dusty trades comprise one of the largest groups exposed to any one industrial hazard, it is quite apparent that the importance of this problem has not been overestimated. Furthermore, it is now well established that exposure to certain kinds of dusts, such as those containing considerable amounts of quartz, has increased the morbidity and mortality rate from respiratory disease; while metallic dusts, such as lead and its compounds, have been associated with general systemic poisoning. Thus, the harmful properties are the composition of the dust, the quantity suspended in the industrial atmosphere, and its particle size.

Investigations of the industrial dust question serve a threefold purpose. First, they enable one to evaluate the extent of the hazard; this is accomplished by obtaining occupational dust exposures, which disclose the dust creating tasks. Second, if clinical studies are also made, dust counts may indicate the permissible amount of dust which may be breathed with impunity. Third, dust determinations are used in an attempt to control the hazard; this is effected by testing the efficiency of devices which have been developed for this purpose.

The quantitative aspects of the dust problem demand standardized procedure in the sampling and analysis of dusts. The American Public Health Association, through its Committee on Standard Methods for the Examination of the Air, made its last report October 27, 1919. This was published in May, 1920.[1] Here it recommended the continuation of the Palmer Water Spray Apparatus as the standard method of dust determination and suggested that if the konimeter[2] or Bill electrostatic collector,[3] developed at that time, proved to be superior, then one or the other of these devices should be adopted.

In 1922, the instruments in common use in conducting dust studies were the Palmer, konimeter, and sugar tube, and, in addition, the U. S. Bureau of Chemistry,[4] in its dust explosion work, employed an apparatus which consisted essentially of an adapter for holding a Whatman filter paper thimble through which air was drawn by a suction pump. By the difference in weight of the paper thimble before and after dust sampling, the weight of the dust was easily determined. Finally, mention should be made of the Anderson and Armspach[5] dust determinator which in 1922 was in use by the American Society of Heating and Ventilating Engineers. This instrument measured the increase of pressure incident to forcing air through a piece of filter paper; this rate of increase of pressure was then taken as a measure of the air dustiness.

However, in the year 1922, it became apparent that the various methods did not yield results which could be

regarded as absolute or even comparable. Consequently, a conference of interested persons was held at the U. S. Bureau of Mines Experiment Station, Pittsburgh, Pa., in 1922, when it was decided to conduct a laboratory study of dust sampling instruments.

Suspensions of dust (5 different powdered substances) were set up in an air-tight chamber at the Experiment Station that year, and simultaneous samplings were carried out with the sugar tube, the Palmer apparatus, the konimeter, the filter paper thimble, and the dust determinator.

During the course of the study, a new instrument, the Greenburg-Smith impinger, for the sampling of dust, was devised (see *Pub. Health Bull. No. 144*). In this instrument, the air to be sampled is drawn through a glass tube and impinged at a high velocity on a glass plate which is kept beneath the surface of the water or other suitable fluid in the collecting flask. The dust is momentarily arrested, wetted by the collecting fluid, and in this manner trapped. After a sufficient volume of air has been sampled, a portion of the collecting fluid is removed to a suitable counting chamber, or cell, for microscopic count, to ascertain the number of particles. The remaining portion of the sample may be subjected to any desired analysis.

In the comparative study, the dust catching efficiency of the impinger was found to be high. Consequently, its physical principles and characteristics were the object of a special study, and finally a satisfactory and practical form of dust sampling instrument, based on this principle, was evolved.*

The apparatus (essentially in its present form), as described in *Public Health Bulletin No. 144,* possessed an efficiency of 94 to 97.5 per cent when sampling a finely divided silica dust suspension at the rate of 1 cu. ft. per minute. The tests used in estimating this efficiency were conducted by an optical method in which a portion of the dusty air delivered to the collecting device was diluted with measured amounts of dust-free air until a "match" was obtained on comparison with the stream of air emerging from the dust collecting device. The comparison, or matching, consisted in producing equal Tyndall effects (equal amounts of reflected light) by the two dust streams when they are simultaneously observed in a beam of light.

So far as the quantitative results of the dust sampling instruments are concerned, the conclusion of the comparative study was as follows:

> Considering the dust caught by the Palmer as unity, the instruments take the following order: On basis of numbers of particles determined—impinger, 5.0; sugar tube, 2.1; and Palmer apparatus, 1.0. On basis of weight of dust determined—impinger, 2.1; thimble, 1.5; sugar tube, 1.6; Palmer apparatus, 1.0.

These results, as well as others obtained in a comparative field study of the Palmer, konimeter, and impinger,[6] led to the selection of the impinger (Greenburg-Smith) by the Public Health Service as the standard device for dust sampling.

Several other instruments for the collection of dust have been developed since 1922. These are the Owens jet dust counter,[7] Drinker's modification of the electrical precipitator device,[8] and, more recently, Green has described a sedimentation cell method[9] and a thermal precipitator device,[10] which are being tried out in England. Of these four devices, the Owens and the electrical precipitator are the only ones

* The instruments and methods described in this paper are generally used in conducting research investigations for the purpose of evaluating the dust hazard in industry. Some are of the opinion that other instruments or methods of quantification of dust may be used for routine plant control of a dust hazard, provided of course that these simpler and quicker methods have been correlated with the standard procedure described in this paper.

which have been used to any great extent and for which data on performance are available. It may be safely stated that in so far as *present day practice* goes, the instruments finding common use for dust collection throughout the world are the impinger, konimeter, Owens, electrical precipitator, and the paper thimble. The others have either been discarded, as in the case of the Palmer and Anderson-Armspach dust determinator, or are still in the developmental stage, as is true of the sedimentation cell, thermal precipitator, and more recently, the electrostatic precipitator being developed by the Westinghouse research workers.*

THE SAMPLING OF INDUSTRIAL DUSTS

General Considerations—It is essential that any dust sampling instrument should be capable of collecting effectively dust of a size present in the industrial atmosphere. Recent studies by the author [11] indicate that industrial dusts are mainly from 0.5 to 5 microns in size, so that an instrument capable of collecting these sizes with a fairly high degree of efficiency should meet the present-day requirements. The range in dust concentrations encountered in industries is very great, depending, of course, on the industrial processes, the devices installed for mitigating the dust created, and the efficiency with which such devices function. For these reasons, an ideal instrument should be one capable of sampling with equal efficiency in both high and low dust concentrations. This factor calls for the prerequisite of a dust collecting medium which shall not add dust to any great degree to the dust in the sampled air. Furthermore, the collecting medium must be uniform in dust content, so that one or two control tests on this medium will be sufficient for a series of samples.

Since the dust content of industrial air is ever varying, it is essential that the dust sampling instrument be capable of collecting air in large quantities at a rapid rate, in order to obtain a representative picture of existing conditions. And, finally, the ideal instrument should be one that requires only a simple and fairly rapid method of analysis. Suffice it to say that an instrument designed for use in the field should embody all these principles, and, in addition, be light in weight, portable, and compact.

To recapitulate, the final selection of a dust sampling instrument for industrial use will depend on the collecting efficiency of the device, on its small errors in analysis, on its portability, and on the ease with which a sample, once obtained, may be analyzed.

Twelve years of experience with the impinger apparatus in this country by the U. S. Public Health Service,[12] by various research workers in our universities, insurance laboratories, and other interested governmental and industrial agencies, have shown this instrument to be of practical value as a device for the study of the industrial dust problem and one apparently filling the requirements set forth in the above discussion. Although the other devices, such as the konimeter, Owens, electrical precipitator, and paper thimble, are utilized from time to time in special problems, the impinger has been adopted quite universally in this country in hygienic dust investigations. For this reason a brief account of the construction and use of this device is presented herein. For details of the other instruments mentioned in this discussion the reader is referred to the original articles describing each, references to which have been given.

The Impinger Tube and Sampling Flask—The impinger apparatus consists essentially of two portions: First, a source of suf-

* Personal communication.

ficient suction to draw the air to be sampled through the sampling device; and second, the sampling device or impinger itself, which consists of a container and the impinger tube and plate. As a source of suction, an electrically driven and a compressed air driven apparatus have been designed. A hand driven apparatus developed at the U. S. Bureau of Mines has also been made. For details of construction of these various forms of suction devices the reader is referred to the original article.[12]

The impinger tube in the model of the apparatus described in *Public Health Bulletin No. 144* (p. 67) consisted of a piece of Pyrex glass tubing, drawn down to a tip with a 2.3 mm. orifice. To this tube a metal tripod and circular impinging plate were attached by means of a bronze split-sleeve clamp. The distance between the orifice and the upper surface of the plate was kept at 5 mm.

In practice, this impinger tube yielded satisfactory results. Nevertheless, it was felt that it would be preferable to eliminate the use of metal, particularly where acid or alkali was to be used as the collecting fluid. Accordingly, there was designed and constructed the all-glass impinger tube shown in Figure I, with circular glass impinger plate about 25 mm. in diameter, fixed by three

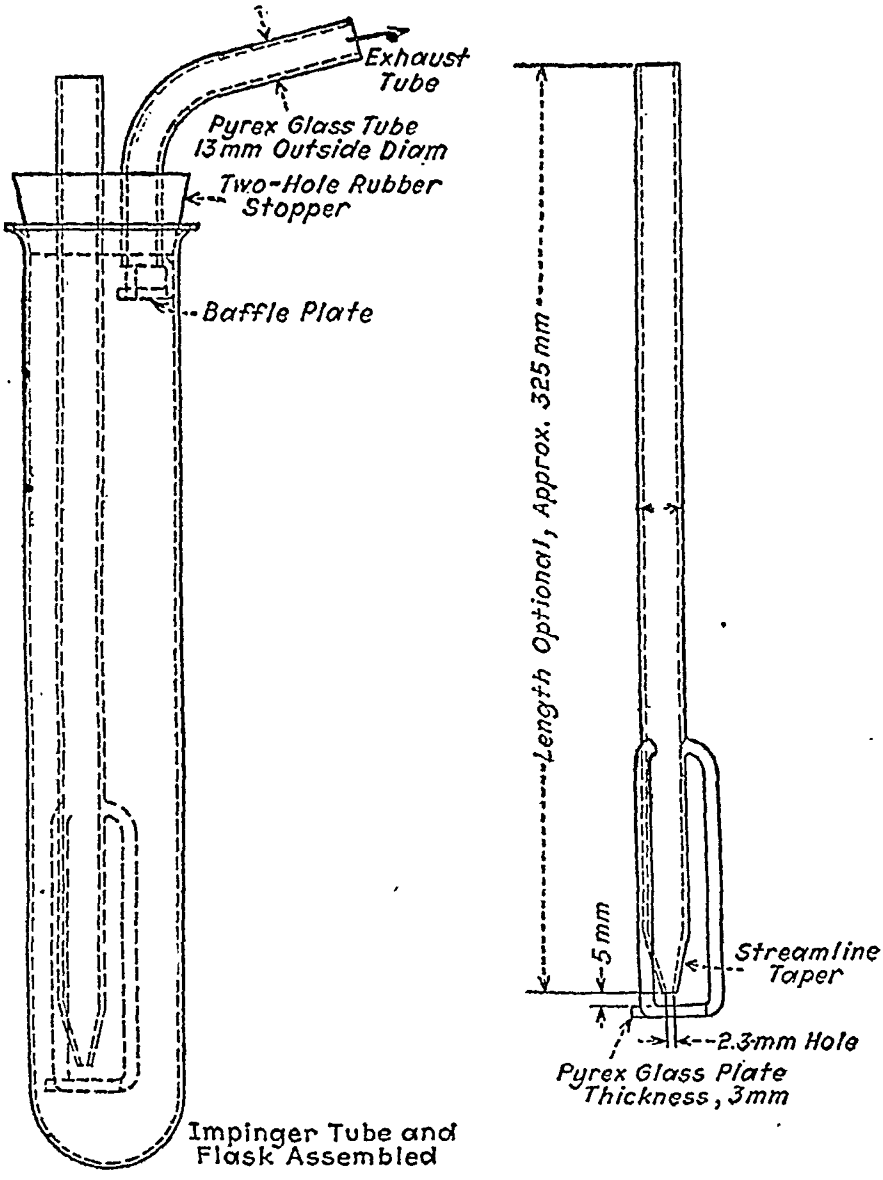

FIGURE I—DRAWING OF IMPINGER TUBE AND FLASK

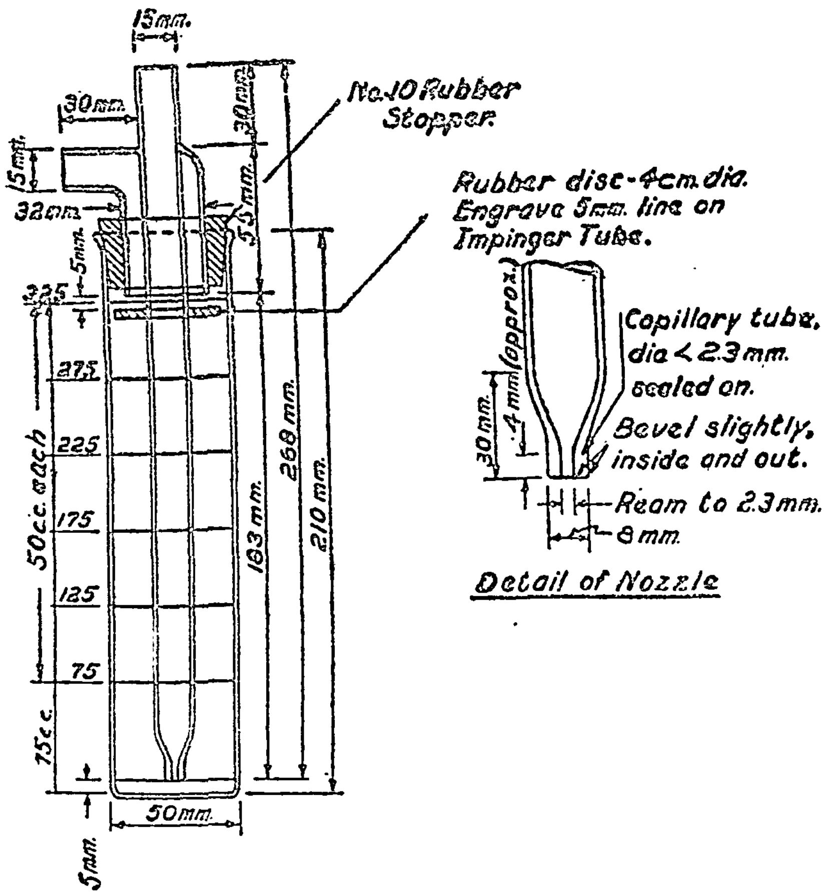

FIGURE II—DRAWING OF MODIFIED IMPINGER AND DETAIL OF NOZZLE, WITH CONSTRUCTION SPECIFICATIONS

supporting rods about 9 cm. long to the impinger tube at a distance of 5 mm. from the orifice. The tube was 13 mm. in outside diameter. Pyrex glass was used throughout. Tubes of this type have been employed without an undue amount of breakage.

A few modifications have been made in the impinger flask. Originally, a round 16 oz. glass bottle fitted with a 2 hole rubber stopper was used. A short time later a 500 c.c. Pyrex glass assay flask (wide-mouth conical Erlenmeyer type) was substituted, which proved to be very satisfactory.

In certain studies it was found desirable to obtain dust samples in the region of the mouth and nose of a worker in order to secure a more representative picture of the air actually breathed. For this purpose the flask shown in Figure I was designed.

A more compact and convenient impinger flask and nozzle has been recently developed for field use.[12a] The modifications in the design of the impinger have in no way altered the basic principle on which the instrument operates. Figure II shows the latest form of the impinger flask and nozzle.

The modified impinger does away with the glass impinging plate, utilizing the bottom of the flask for this purpose. The suction connection is combined with the inlet tube, thus simplifying the device still further. The essential portions of the device consist of a straight piece of Pyrex glass tubing 15 mm. in outside diameter and approximately 275 mm. in length. The tube is drawn down in stream-line form at its lower end, to a tip with a 2.3 mm. orifice. In sampling, this orifice is kept approximately 5 mm. from the bottom of the flask, a guide line on the flask indicating this distance. The flask is 50 mm. in diameter and 210 mm. in height, and requires a fluid (water) volume of only

75 c.c. to give the proper depth of immersion to the nozzle. An entrainment trap in the form of a rubber ring prevents the possible loss of the liquid (and dust) with the outgoing air.

Since the impingement distance in this instrument is not fixed, as in the previously described type, it was necessary to determine the limits within which this distance, as well as the angle of impingement from the perpendicular, varied. Studies conducted on these factors by the designers of this instrument showed that as regards the angle of impingement (using silica dust) one can have a maximum displacement of the nozzle without changing the efficiency obtained when the nozzle is in the vertical position. Also, it was found that the impinging distance can be varied from 2 to 12 mm. without impairing the efficiency against silica dust to any appreciable degree.

In taking dust samples the location of the sampling place, the time during which sampling is conducted, and the duration of sampling, are all chosen in an effort to obtain the data required by the study in progress. Obviously the requirements of the study under way govern the procedure to be employed.

The duration of the sampling period should be such as to yield a satisfactory suspension of dust for analysis, and is thus dependent on the concentration of dust in the atmosphere. Under the usual industrial conditions, samples of from 10 to 30 cu. ft. of air are sufficient to yield enough suspended dust for analysis. Since a sampling rate of 1 cu. ft. per minute is maintained, this will require a sampling period of from 10 to 30 minutes. A stop watch may be used to measure this period. After a sample is obtained, the impinger tube and flask are placed in a suitable carrying case for transport to the laboratory for subsequent analysis.

In Table I, a summary is presented giving the characteristics of the most commonly used dust sampling instruments.

It may be seen that all of the devices have a high sampling efficiency. Although each instrument has some disadvantages, experience has shown that there is a specific use for each device. The *impinger apparatus* can be employed for sampling in both high and low dust concentrations, and has the added advantage that the samples may usually be analyzed microscopically, chemically, or gravimetrically. In fact, it has also proved useful for sampling fumes and gases, provided certain precautions are exercised.[13, 14] The *electrical precipitator* finds its greatest field in the sampling of smoke and fumes. The *paper thimble* has been used very successfully for the sampling of radioactive dusts,[15] and is constantly employed in sampling organic dusts in connection with dust explosion prevention work. The *Owens jet dust counter* was primarily developed for the sampling of outdoor dusts and smoke, and is still used quite universally for this purpose. It is usually not practical for the sampling of industrial dusts of high concentration, the dust record being so thick as to make it impossible of enumeration. However, it has been used successfully for obtaining samples of industrial dusts for the purpose of particle size measurements.[11] The *konimeter* is very useful in obtaining rapid samples in moderate concentrations of aerial dusts. For quantities of 15 to 18 million particles or less per cu. ft. of air, it is very efficient and should find considerable use in control work and in preliminary studies. For such investigations the *Owens* and *konimeter* have the added advantage that they require no power for operation, are very small and compact, and do not need a highly skilled observer to obtain samples, although some skill is required in the enumeration of the dust records and in the interpretation of results.

Where the properties of an industrial dust, both chemical and physical, may vary from hour to hour at a given work position, due to the varying nature of the process, *e.g.*, periods of blasting, hard-heading, uneven ventilation, etc., additional precautions in sampling are obviously necessary.

So far this discussion has been

TABLE I

SUMMARY OF CHARACTERISTICS OF CERTAIN DUST-SAMPLING INSTRUMENTS

Instrument	*Characteristics*								
	Principle of operation	*Efficiency against industrial dusts (per cent)*	*Application*	*Method of quantification*	*Skill in quantification*	*Sampling skill*	*Volume of sample*	*Advantages of Instrument*	*Disadvantages of instrument*
Impinger......	Impingement.	98+.....	General......	Count, gravimetric, chemical	Considerable	Some....	Any amount; rate = 1 cu. ft. per minute	1. High sampling efficiency in either low or high dust concentrations 2. Sample can be quantificated by counting, weighing, or chemical analysis	1. Requires power for operation
Electrical precipitator	Electrical precipitation	100......	......do	......do......	....do....	Considerable	Any amount; rate = 10 to 50 liters a minute	1. High sampling efficiency in either low or high dust concentrations 2. Sample can be quantificated by counting, weighing, or chemical analysis 3. Large samples obtained rapidly	1. Requires electric power for operation 2. Some danger from high voltages
Paper thimble.	Filtration.....	100......	......do......	Gravimetric, chemical	Some....	Very little	Any amount; rate 1 to 2 cu. ft. per minute	1. High sampling efficiency 2. Samples large volumes rapidly 3. Laboratory technic requires only drying and weighing for most dusts 4. Samples may be kept indefinitely without deterioration	1. Samples cannot be counted 2. Drying of thimbles is a very slow process
Owens jet dust counter	Jet condensation	99+.....	Outdoor dust and for particle-size studies	Count........	....do....	....do....	50 to 1,000 c.c.	1. Light, simple, and quick to operate 2. High efficiency for atmospheric smoke 3. No power needed for operation 4. Laboratory technic requires only a microscope	1. Dust cannot be weighed or analyzed chemically 2. Obtains only "grab" samples due to small sampling volume 3. Impractical in high dust concentrations 4. Selective action; efficient only for dusts 2 microns or less
Konimeter.....	......do......	99+.....	For concentrations less than 18 million particles per cu. ft.	......do......	....do....	....do....	10 c.c........	1. Light, simple, and quick to operate 2. Efficiency high for moderate concentrations 3. No power needed for operation 4. Laboratory technic requires only a microscope	1. Dust cannot be weighed or analyzed chemically 2. Obtains only "grab" samples 3. Not practical in high dust concentrations; limited to 15 or 18 million particles, or less, per cu. ft.

limited to the collection of dusts of the type usually considered capable of producing fibrosis of the lungs or upper respiratory damage. For the collection of *poisonous dusts,* such as lead, the impinger or electrical precipitator has been found to be especially suited. In the case of the *impinger,* when used in sampling *lead dusts,* care should be taken that the sampling flask is of lead-free glass and that the distilled water also contains no traces of this substance. It is customary to run a blank for every 10 samples or so, which takes into account any lead present in the reagents. In sampling for minute traces of poisonous compounds, it is very essential that sufficiently large samples be obtained, enough to contain adequate amounts of the material for the particular method of analysis to be employed. It is apparent that both the impinger and electrical precipitator fulfil this requirement owing to their high air sampling rates. While the *paper thimble* has been used successfully for the collection of radioactive dusts, on the whole, the impinger and precipitator collect such dusts in a manner best suited for subsequent chemical analysis.

THE ANALYSIS OF INDUSTRIAL DUSTS

General Considerations—In the case of fibrosis producing dusts, the particle count appears at present to offer the best index of the hazardousness of a dusty operation. Obviously, the method of enumeration which is utilized should be governed by the consideration of the size of the dust which is of hygienic significance. To date, the relative significance of various sizes of dust particles in the production of lung fibrosis has not been satisfactorily established. However, we do know that the inhalation of certain industrial dusts has been found to be associated with definite injury to the pulmonary tissues. Hence, a knowledge of the size-frequency of these industrial dusts will, in a measure, determine the method of enumeration to be employed.

At present there are several sources of information which cast some light on this subject. One is the work of pathologists who have determined the size of dust particles recovered from silicotic lung tissue, another is the work done in connection with the retention of dusts in inhalation experiments, while additional information is presented by particle-size studies.

The work of the South Africans,[16, 17, 18] and Scheid of Germany,[19] indicate that most of the dust particles recovered from silicotic lungs of both humans and animals were between 1 and 3 μ in size, only about 13 per cent of the particles being less than 0.5 μ. Experiments on dust retention by Drinker and his associates,[20, 21, 22] as well as that of other investigators [23, 24] on the retention of dusts and fumes by man, also show that the finely divided suspensions of dust are retained but to a small extent in the lungs, usually from 15 to 25 per cent of the amounts inhaled. More recently, King and Dolan [25] have shown that extremely fine particles of quartz dust are rapidly dissolved in the mildly alkaline body fluids and are excreted in the urine. And finally, particle-size studies of industrial dusts in air [11] indicate that about 60 per cent of the dusts are from 1 to 3 μ in size and that only about 30 per cent of the particles are less than 1 μ.

From the foregoing information it is evident that in order to obtain a representative sample of industrial dust in air, one should employ an instrument capable of arresting, with a high degree of efficiency, all kinds of dusts, of sizes ranging from 0.5 to 5 μ at both high and low dust concentrations. The impinger apparatus fulfils this requirement.

The method of counting the dust particles in the samples should have

small analytical errors and should reveal only those significant particles present in industrial atmospheres. It should not be the aim to count all the dust particles present in the samples (which may be accomplished by either the use of high magnifications, dark-field illumination, or combinations of both), *e.g.*, it is necessary to differentiate between the dust content in normal air and industrial air. As has been indicated, this difference is apparently sharply marked in so far as the dust particles between 0.5 and 5 μ are concerned; but this difference would be masked and lost were there included in the determination the particles of ultra-microscopic size which are present in vast numbers in all air.

Enumeration of Impinger Samples—Owing to the solubility of most industrial dusts in water,[26] it is good practice to analyze impinger samples within 24 hours after collection. Dilution of the sample, if needed, may be made in the original sampling flask, to either 250 or 500 c.c. If further dilution is advisable, a 100 c.c. graduated flask may be employed. This dilution may conveniently be such that the number of particles counted in each microscope field is about 50 to 75. The contents of the flask are next thoroughly agitated in order to obtain a uniform suspension, and two portions of about 1 c.c. each are removed with a pipette so as just to fill, without bubbles, two Sedgwick-Rafter counting cells (see Figure III). The cells have been previously cleaned very carefully in order to remove any adventitious dust, and have been kept protected from dust particles by the cover slip.

In making dust counts an eyepiece micrometer known as a Whipple disk is employed (see Figure III). This disk has a large square engraved on it, covering a large part of the field, and this square is divided into 100 medium sized squares, one of these in turn being further subdivided into 25 very small squares. Using an ordinary microscope provided with a suitable eyepiece and objective, and fitted with an Abbé condenser, the proper tube length of the microscope is determined by calibration with a stage micrometer, so that the side of the large square of the eyepiece covers 1,000 μ (1 mm.). (A 7.5X eyepiece, 16 mm. objective, and a tube length of 178 mm. has been found to yield this result.) The large square of the eyepiece ruling, therefore, incloses the dust in an area of 1 sq. mm.; and since the cell is 1 mm. deep, all the dust suspended in 1 cu. mm. of the water is under the ruled field. This examination is accomplished by raising and lowering the lens system so as to focus throughout the entire depth of the cell. As a source of illumination, an ordinary small electric microscope lamp may be employed. In order to provide a high degree of visibility for refractile objects it is best to lower the Abbé condenser system below the usual focusing point and to restrict the opening in the iris diaphragm.

The dust is allowed to settle for 20 to 30 minutes before counting is done. In general, only particles less than 10 μ in diameter are counted. The inclusion of particles larger than 10 μ in the specimen would make but little change in the total count. The average diameter of a particle for the purpose of this exclusion is judged by inspection. In practice it is necessary to count the dust in only one-quarter of each ruled field, the entire field having been examined for uniformity. Such counts on 5 fields, so dispersed as to be representative, are made on each of the two Sedgwick-Rafter cells. These 10 counts are averaged, but this average is not to be taken as the final count until a corresponding con-

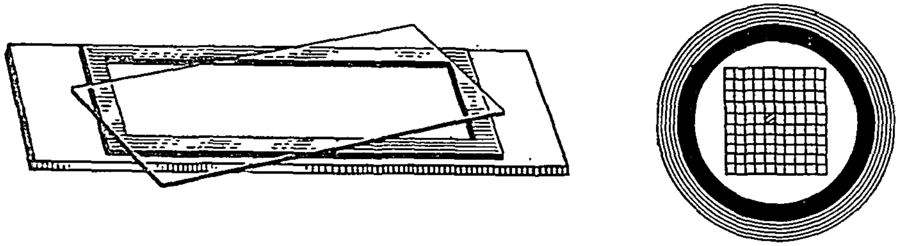

FIGURE III

trol count has been subtracted. In all cases a sampling flask which is handled in the plant, but through which no air has been aspirated, is used as the control for the particular series of samples taken in that plant on that particular day, and counts are made on this control fluid in the same manner as on the fluid through which the air sample has been impinged. The control sample takes into consideration any dust which may be present in the eyepiece micrometer, in the lenses of the microscope, in the Sedgwick-Rafter counting cell, and in the sampling fluid itself. From the average gross count obtained on the impinger sample, the average control count is to be subtracted to give the average net count per ¼-microscopic field.

The average net count per ¼-microscopic field is multiplied by 4 to yield the average count in the total field. Since the Sedgwick-Rafter cell is 1 mm. deep, this figure represents the number of particles in a cu. mm. of the diluted sample. This value is multiplied by 1,000 to give the count per c.c. of sample, and again by the total number of c.c. of fluid to which the original specimen was diluted. This product is divided by the number of cu. ft. of air sampled. In summary, the number of particles per cu. ft. of air = average net count per ¼ field times a factor, where the factor =

$$\frac{4 \times 1{,}000 \times \text{total volume of diluted sample in c.c.}}{\text{Volume of air sampled in cu. ft.}}$$

The method of dust counting presented herein is capable of including dust particles as small as 0.7 μ.[10, 11, 27] * From data presented earlier on the size-frequency of industrial dusts, it is apparent that this method is capable of disclosing about 85 per cent of the dust particles collected by the impinger apparatus. The small percentage of dust this method fails to reveal is considered negligible, when one takes into consideration the simplicity of the method, the fact that results may be checked by trained observers, and that it is one of practical application since, in the numerous dust studies conducted by the U. S. Public Health Service on the health of workers in dusty trades, high correlations were obtained between the intensity of exposure to dust and the degree of lung damage among the workers.

* Some of the members of the committee are doubtful whether dust particles under 1 μ (and possibly 2 μ) can be seen by means of a light field method of illumination. Hence these resort to a dark field microscopic system almost exclusively, and check this from time to time with the standard light field method.

THE DETERMINATION OF THE CHARACTER AND COMPOSITION OF INDUSTRIAL DUSTS

Size of Dusts—So far as the size of the dust particles is concerned, it is apparent that in order for any given dust to produce injury to the lungs it must gain access to the parenchyma of the lungs, the site where the harmful effects of the dust take place. It has already been shown that not all of the particles of inhaled dust gain access or are retained by the human lungs. For these reasons it is of some value to determine the size of the dust present in the industrial atmosphere.

It has also been demonstrated that particles of a size greater than 10 μ in longest dimension are very seldom found in the lungs, due partly to the fact that the number of such particles, in industrial air, is comparatively small when particles in the lower size range are considered. Due to gravity, which causes rapid settling of suspensions, and due to the protective action of the upper respiratory tract, these larger particles do not penetrate to the terminal portions of the lungs. Hence, it is obvious that attention be directed to those particles which are less than 10 μ in longest dimension.

The likely procedure for the sampling of atmospheric dusts for particle-size studies would be to employ the same instrument utilized in sampling dust for quantitation.

In the past, the Owens jet dust counter has been employed extensively for such investigations, although of late impinger samples have been utilized for this purpose; comparative studies of the two instruments yield practically identical results. The Owens jet dust counter obtains a sample of dust from the air in more or less unaltered con-

dition, since with this device the atmospheric dust is directly projected on a naked cover-slip. Moreover, the instrument is small, compact, requires only hand power, and samples are obtained quickly and easily without needing much skill of operation. Once these samples have been obtained and properly mounted, the dust particles may be measured by the use of a filar ocular micrometer at a magnification of 1,000 diameters (oil immersion objective).[28] The horizontal diameter of at least 200 dust particles in several representative fields are measured for each sample. With this magnification it was found possible to measure particles as small as 0.5 μ in size, while particles smaller than this size are easily distinguished at this magnification and their presence recorded.

Photographic methods have been suggested and used for measuring dust particles, but in order to obtain good photomicrographs it is essential that the dust particles be in one plane, free from Brownian movement and well dispersed. Since industrial dusts are seldom of a uniform size it is difficult to fulfil the first requirement. Comparisons have been made between the results obtained with the direct filar measurements and the photographic method on typical industrial dust samples. This comparison demonstrated that the simpler and less expensive filar method yielded practically the same results. Since the filar method fulfils the requirements of this problem it is suggested for use in such studies, unless permanent records are wanted, where photographs might well meet the requirement.

Composition of Industrial Dusts—The methods used in determining the composition of certain poisonous dusts, such as lead compounds, are amply discussed in the numerous publications dealing with these problems. Concerning the so-called fibrosis producing dusts, the work of the past 20 years on the problem of dust inhalation has demonstrated that, in general, the degree of health hazard associated with the inhalation of any dust, all other factors remaining constant, is dependent upon the mineralogical composition of the dust. For example, it is now established that the inhalation of certain types of dust, such as granite dust[29] may, in time, produce fibrosis of the lungs, frequently associated with tuberculosis. In other cases exposure to dust may result in the production of a far lesser degree of fibrosis without subsequent tuberculosis; this is true of cement dust.[30] And finally, there are certain types of dusts which produce little lung fibrosis, as typified by marble dust.[31] In general it has been found that those dusts which are high in quartz content are the ones which most readily produce a disabling fibrosis of the lungs.

The question of ultimate importance of silicates or combined silica (silica, sericite, talc, etc.) in the production of pathology is at present undergoing extensive study, but it is trusted that the methods of sampling and counting, enumeration, and sizing of dust particles above described will be found to be adequate for all injurious forms of mineral and other industrial dusts. Should it be ultimately shown that dusts less than 0.5 μ in diameter are a serious factor in the production of disease, resort may have to be made to the more refined methods of estimation referred to, and possible new methods devised.

Analytical methods for determining the chemical composition of some inorganic atmospheric dusts are referred to by W. A. Cook in another section of this report. It is to be noted, however, that a chemical analysis of a mineral dust will not disclose the various percentages of minerals existing in the dust. For example, a chemical analysis of granite dust will not reveal the percentage of quartz present in the dust, but will only tell the analyst the total silica, combined and uncombined. Hence, the close relationship

of the chemist, mineralogist, and petrographer to the situation must be kept constantly in mind. It is not considered, however, within the scope of this report to go into this feature.

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Advisability of Routine Laboratory Examination of Food Handlers

YOUR Committee on the Advisability of Routine Laboratory Examination of Food Handlers made a progress report in 1934 (see *Year Book 1934–1935,* page 113) on two aspects of the food handler problem, *i.e.,* an evaluation of the recommendations of health executives and the significance of food handlers as a source of infection. The recommendations of the Surgeon General's Advisory Board on Milk Ordinance were cited. These recommendations are part of the Milk Ordinance and Code of the U. S. Public Health Service. The committee appreciates that these regulations are based upon an extensive study of the milk handler problem. Mr. Abel of the Advisory Board made a careful survey of the food handlers' problem in Alabama. In his recommendations solicited by the committee in 1933, he made a valuable suggestion which the chairman had hoped to follow up; namely, a study of the use of dyes for determining the authenticity of specimens of feces in the search for typhoid carriers. There has been no opportunity to make this investigation.

Special investigations have been made by members of the committee: Mr. Mickel, *et al.,* on the detection of carriers among food handlers (*A.J.P.H.* 24:493, 1934) and laboratory examinations of milk handlers (*A.J.P.H.* 25:557, 1935); Dr. Gilbert, on the practical limitations of examinations of specimens collected without regard to clinical history or epidemiological evidence (*A.J.P.H.* 24:193, 1934); Dr. MacNabb, on control measures in the municipalities of the Province of Ontario and routine examinations of food handlers in selected groups.

During the year a study of the incidence of *Beta hemolytic streptococci* from throat cultures of milk handlers was made by the Connecticut Department of Health and Yale University School of Medicine. The results of these studies will be reported in the *American Journal of Public Health.*

Routine health examinations—Although not strictly within the province of this committee, consideration of the control measures recommended by the health executives has been continued during the year. The New York City Department of Health rescinded the section of the Sanitary Code which provides for the yearly health examinations of food handlers. The control measure had been in effect for about twenty years. "The plan," quoting from Dr. Rice's report, "was adopted in 1915 in order to impress upon food handlers the rôle played by infection in the spread of communicable diseases and to encourage the practice of periodical health examinations." It is a significant fact that routine examinations of food handlers continue to be inaugurated by health executives for the same or similar reasons. Such examinations may include routine laboratory examinations of all applicants or only laboratory examinations when indicated by the medical examiner.

Significance of food handlers as sources of infection—In order to study further the significance of food han-

dlers as sources of infections, a questionnaire was sent to the state epidemiologists requesting information regarding the number, the infection, the source and mode of food-borne epidemics during 1930–1934 inclusive, and the number of cases and deaths. The committee wishes to thank the epidemiologists for their splendid response. In a number of instances, it meant special effort to accumulate the information.

In a surprising number of states, the records were incomplete or information unavailable. From an analysis by the committee of the replies, the following conclusions were drawn:

1. That many of the state departments of health are inadequately organized, not only for detecting outbreaks of food-borne infections, but also for placing them in their proper categories.
2. That the most important single food which may become a disease vector is raw milk.
3. That wherever a state department of health is well organized and proper search is made, a considerable number of outbreaks are found in which food is the vehicle of transmission.
4. That the number of these outbreaks, even in the imperfect manner in which they have been reported, is sufficient evidence to make the inspection of food handlers by some method or other seem worth while.

EVALUATION OF LABORATORY EXAMINATIONS

Laboratory examinations and tests are obviously for the detection of carriers and mild cases or for the confirmation of clinical findings. Laboratory examination as an aid to diagnosis needs no discussion. The need for laboratory examinations supplementing epidemiological investigations of food-borne outbreaks is recognized as essential. The value of routine laboratory examinations has been questioned, however.

The discussion of routine laboratory examinations for detection of carriers follows:

The index to the typhoid carrier is the typhoid case and a careful follow-up of convalescents and contacts would concentrate effort at the source of danger and eliminate the necessity of examining all food handlers for a possible carrier. In illustration of this, the experience of New York City is significant. Since 1915, a total of 565 typhoid carriers was discovered in New York City. Of this number, 308 were discovered as the result of epidemiological investigations made in connection with cases of typhoid fever, and 227 were discovered through stool examinations of patients after convalescence. In contrast to this, out of three and one-half million routine annual examinations made of food handlers during the past 18 years, only 30 typhoid carriers were discovered. This is less than one out of each 100,000 food handlers examined.

The specimens most frequently submitted to the laboratory from food handlers are for the control of enteric infections. These may be either blood serum for the Widal reaction or feces for *B. typhosus*, *B. enteritidis*, etc. The Widal has a limited value for it has been shown that carriers occasionally have no demonstrable agglutinins in the blood stream. The value of the examination of feces depends upon the number of specimens submitted and authenticity of the specimen. Bile is the most satisfactory specimen for the identification of a typhoid carrier. Laboratory examinations of routine specimens from food handlers are not recommended, except from raw milk handlers. However, routine examinations of raw milk handlers at regular intervals without other control measures do not render the supply of raw milk safe.

Septic sore throat and scarlet fever—Milk-borne outbreaks of septic sore throat and scarlet fever are of great

importance, but routine throat swab examinations for the detection of carriers are not practical. The wide distribution of hemolytic streptococci, and the multiplicity of strains makes classification necessary. The classification of hemolytic streptococci is a difficult procedure, involving time and special technic. Hence, the examination of throat swabs for identification of hemolytic streptococci is not recommended except under epidemiological direction.

Diphtheria—Diphtheria bacilli are of little significance in food-borne outbreaks. The detection of carriers has no practical value.

Tuberculosis—Food-borne tuberculosis is confined almost entirely to the bovine type as far as we know. Laboratory tests are not as efficient for diagnosing missed cases as physical examinations in conjunction with the skin test and X-ray.

Amebic dysentery—Carriers of *Entameba histolytica* still present some unsolved problems. How many persons contract the disease from another is not clear. The laboratory examination must be made by an experienced bacteriologist and on carefully collected specimens. The detection of *Entameba histolytica* in chronic amebiasis (the carrier) usually involves the examinations of scrapings obtained at sigmoidoscopy. Hence, laboratory examinations of specimens from food handlers are not recommended except under epidemiological direction.

It is felt by the committee that the indiscriminate collection and examination of specimens from food handlers are undesirable, and that such examinations should be made only where called for by epidemiological or clinical findings.

MINNA CROOKS YOUNG, *Chairman*
A. L. MACNABB
RUTH GILBERT
S. A. KOSER
MAZŸCK P. RAVENEL
FRIEND LEE MICKLE

Aspects of Veterinary Public Health

VETERINARIANS who become peculiarly involved with the work of public health usually will be found active in: (1) Meat inspection, (2) Milk inspection, (3) Bovine tuberculosis control, (4) Biologic production, (5) Immunology, (6) Bacteriology, (7) Serology, (8) Rabies control, and (9) Academic.

The veterinarian in general practice only contacts such specializations, casually. Tuberculosis, rabies, and brucelliasis constitute material of public health significance most frequently published in American veterinary journals. In such articles, the rule is that the public health aspects are incidental to more pertinent veterinary problems.

Under these circumstances, the veterinarian in public health has specialized away from his fundamental training for general practice and has become absorbed in logical groups or sections which include: (a) Laboratory Section, (b) Food and Nutrition Section, (c) Public Health Education Section, and (d) Instances of veterinarians who are health officers.

The loss of professional identity is not different from the case of the doctor of human medicine who has entered sections specializing in branches of public health. We can conceive that the creation of a separate section for veterinarians would only result in confusion, since the actual functions within the profession are so varied in actual health department practice.

An expression of opinion from the majority of veterinarians in public health work has so far been impossible. This is due to the fact that there is not available a registry of such men. We believe this should be one of the first endeavors of a committee during the coming year. Such a listing, with notations of the type of work engaged in, would alter the present obscure viewpoint to one of a more definite perspective.

Letters have been received from Missouri, Pennsylvania, New York, Illinois, Iowa, and Canada. Trends of such letters include such statements as:

1. " It does not occur to me that the Sections of the American Public Health Association should be set up with a view of giving any particular profession recognition."
2. " A section on veterinary public health would probably not be a flourishing one at least for some years "
3. " ' Veterinary ' is objectionable from the standpoint of linking such an activity directly with the practising veterinarian. We do not have physicians' public health sections."
4. " I do not consider it advisable to form a separate veterinary public health section immediately."
5. In Canada: " I do not think that there is any desire with us to form a separate section. . . . "
6. " . . . a section for veterinarians would scarcely seem in accord with the present policies any more than would a section for physicians."
7. " . . . it often happens that a veterinarian is the one most competent to discuss human infections of animal origin. Papers of this kind would be of general medical and bacteriological interest, and it does not seem to me they should be shut off by themselves in any way from the (Laboratory) Section."

Those favoring a separate section were few in number. Arguments favoring such a break from the Laboratory Section, etc., fundamentally reflect the feeling that the veterinary profession

does not obtain the recognition it should in the good work done. The following excerpt from a letter of December 14, 1934, was the result of careful checking with associates before the chairman expressed his general conclusion:

"Those who teach Veterinary Hygiene in veterinary schools are very anxious to make public health officials aware of the fitness of the veterinary graduate to supervise milk and meat production. Therefore, I am voicing the desire of that body when I support those who believe that a separate section of the American Public Health Association for the consideration of the problems of food inspection should be formed."

Again, we can give voice to a strictly personal opinion as chairman of this committee. Why not inaugurate in the pages of the *Journal* a roster of veterinarians who are members of the American Public Health Association? Why not list the Fellows and the Associates? Many familiar names would be recognized in such a listing—names of workers who produced as "sanitarians" work of moment and importance to our general efforts in public service. An abstract section for articles pertinent to public health produced by veterinarians would remove some of the obscurity to the profession without in any way divorcing us from our chosen Sections.

The majority should formulate an opinion. For that reason this committee cannot offer more than a progress report. Once a roster of veterinarians is obtained, then can they be generally circularized, and a survey by questionnaire should result in a decision, during the year, as to the desire or lack of a desire for a separate section.

R. V. STONE, *Chairman*
A. L. MACNABB
I. A. MERCHANT

Resistance of Micrococci to Pasteurization*

ONE of the most commonly encountered groups of organisms in milk and other dairy products is the group of micrococci. The public health significance of this group, its effect on the chemical changes in the milk, and its relation to the sanitary production of milk, has been discussed by a number of workers. The results of these discussions based upon research have not been concordant in their conclusions. One of the difficulties of obtaining more concrete data with respect to the micrococci is due largely to the variability of individual strains with respect to their reaction to external influences, particularly heat. It must not be overlooked that other variable factors as age of culture, reaction of media, etc., may affect the heat resistance of this group.

The public health significance of the micrococci still remains a problem due to the variability with which toxins are produced by certain species of this particular genus. It has been found that the orange types (*Micrococcus aureus*) are more given to the production of toxins than any other of the species. However, there appears to be a variation also in this respect due probably to the type of medium and the source of nitrogen provided these organisms. For this reason, it is difficult to determine definitely the types which are of public health significance from this particular standpoint.

The ability of the micrococci to resist heat, particularly the pasteurization temperature, *viz.*, 145° F. for 30 minutes, is also a variable character. A study of the plates made from pasteurized milk in routine control work will generally reveal the presence of a certain number of micrococci. If the plates are allowed to stand at room temperature for several days, the micrococcus colonies frequently become more readily recognizable because of the development of lemon yellow or orange pigments. None of the species of this genus have been found to be thermophilic, *i.e.*, they will not grow at 55° C. (131° F.).

It is of interest to note that although these organisms are very common in milk and dairy products, only meager data are available as to their ability to resist 145° for 30 minutes.

Sternberg (1887) and Van Geuns (1889) were among the first to study definitely the heat resistance of the micrococci. The latter found that the yellow types in some cases were more resistant than the strains which failed to produce pigment. He also noted that certain strains were completely killed at 140° F. for 30 minutes, while other cultures resisted 145° F. when held for the same length of time. Dyar (1895) found a species of micrococcus which resisted 212° F.

From the standpoint of pasteurization, the work of Russell and Hastings (1902), as well as that of Orla-Jensen (1919), indicates that there are definite species of micrococci which will resist ordinary pasteurization temperatures. Russell and Hastings found a lemon yellow micrococcus which withstood pasteurization and required 169° F. to be killed. Orla-Jensen reports that

* Report of the Committee on Milk Pasteurization Studies of the Laboratory Section.

certain of the white liquefying types will resist 145° to 165° F. for 15 minutes.

More recent work has shown that the yellow type of micrococci are more resistant to pasteurization temperatures than any of the other species. Robertson (1927), Hammer and Trout (1928), Hucker (1928), Eglinton and Yale (1931), and more recently Myers,* have found that the yellow or orange types are resistant to a temperature of 145° F. for 30 minutes.

The members of this genus are more heat resistant than any other of the generally encountered non-spore-bearing organisms. Since many species of this genus have thermal death times considerably greater than 30 minutes at 143.5° F., they are not killed by efficient pasteurization. Dotterrer (1923) was one of the first to point out that where producers bring in milk with a high bacterial count, the counts from the pasteurized milk may also be high because large numbers of bacteria, usually micrococci, may be so heat resistant that they are not killed by the pasteurization. Dotterrer, Myers, and Phelan * have made extensive use of routine laboratory tests to locate producers whose milk is contaminated with heat resistant organisms. It is possible also by carefully controlled laboratory

* Private communications.

TABLE I
THE THERMAL DEATH POINTS OF MICROCOCCI

Date	*Organisms*	*Medium Used*	*Temperature ° F.*	*Length of Holding Time, Min.*	*Per Cent Killing*	*Remarks*	*References*
1887	*Micrococcus sp.*	Broth	145	10	0	Used special bulbs	Sternberg, 1887
	Micrococcus sp.	Broth	140	30	0	" " "	
1889	*Micrococcus sp.*	Broth	145	30	100	Used test tubes	Van Geuns, 1889
	Micrococcus sp.	Broth	145	30	95	" " "	
	Micrococcus from water	Broth	145	30	100	" " "	
	White *Micrococcus sp.*	Broth	145	30	100	" " "	
	Staphylococcus pyogenes	Broth	145	30	100	" " "	
	Staphylococcus pyogenes albus	Broth	145	30	90	" " "	
	Staphylococcus pyogenes aureus	Broth	150	30	100	" " "	
	Staphylococcus pyogenes citrens	Broth	145	30	100	" " "	
1895	*Micrococcus sp.*	Broth	212	—	?	Used test tubes	Dyar, 1895
1902	Lemon yellow *Micrococcus sp.*	Milk	169	—	100	Used test tubes	Russell and Hastings, 1902
1919	*Tetracoccus casei*	Broth	150	15	0	Used test tubes	Orla-Jensen, 1919
	Tetracoccus casei	Broth	165	15	80	" " "	
	Tetracoccus casei	Broth	165	15	15	" " "	
	Tetracoccus liquefaciens	Broth	145	15	0	" " "	
	Tetracoccus liquefaciens	Broth	145	15	0	" " "	
1927	*Micrococcus conglomeratus*	Milk	151–4	30	100	Used special bulbs	Robertson, 1927
1928	*Micrococcus epidermidis*	Milk	145	30		Used test tubes	Hucker, 1928
	Micrococcus varians	Milk	158	30	0	" " "	Hammer and Trout, 1928
	Micrococcus varians	Milk	176	30	100	" " "	
	Micrococcus luteus	Milk	158	30	0	" " "	
	Micrococcus luteus	Milk	176	30	100	" " "	
	Micrococcus candidus	Milk	145	30	0	" " "	
	Micrococcus luteus	Milk	145	30	0	" " "	
1931	Yellow *Micrococcus sp.*	Milk	143	30	10	" " "	Eglinton and Yale, 1931
1935	Yellow *Micrococcus sp.*	Milk	145	30	10	" " "	Myers, 1935
	Staphylococcus aureus	Milk	145	30	98	" " "	

pasteurization in connection with commercial plant pasteurization to determine whether high colony counts on the pasteurized milk are due to the presence of large numbers of heat resistant bacteria or to defective or inadequate commercial pasteurization.

A study of the micrococci resisting pasteurization may throw considerable light on the conditions under which the milk was produced and pasteurized. In most instances the micrococci are inhabitants in the normal udder and, according to Breed (1928), the normal micrococcus flora of the udder may be several thousands per c.c. without any evidence of an infection being present. Among these udder types are to be found the yellow or the most resistant varieties of micrococci. For this reason, when commercial pasteurization is carried out effectively as demonstrated by comparison of pasteurization in the laboratory of small samples with samples secured from the plant pasteurizer, and heat resistant micrococci found still to be present, the source of these organisms may be the bovine udder.

However, Wickham and Widmer (1931) feel that thermoduric organisms are derived from improper sterilization of the utensils and that their presence should be considered when quality is used as a basis for payment to producers. They feel that shippers who deliver milk at the pasteurizing plant free from thermoduric organisms should be given preference over shippers furnishing milk that contains large numbers of heat resistant bacteria.

When micrococci are present in pasteurized milk they may be of the heat resistant types which will resist 145° F. for 30 minutes (Table I), or they may be of the border-line heat resistant varieties which survive pasteurization if this process is not carried out efficiently.

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ROBERT S. BREED, *Chairman*
G. J. HUCKER, *Secretary*
L. H. BURGWALD
MAC H. MCCRADY
R. P. MYERS
R. C. THOMAS

Coördinating Committee on Standard Methods

THE membership of the Coördinating Committee remains exactly as it was constituted at the Indianapolis meeting. The selections made then were so fortunate that no change has been contemplated. Each of the Chairmen of the three Standard Methods committees has put into his work that combination of sincerity, devotion, and enthusiasm which is so rare and precious an asset to any organization. The keen interest of the Section Secretary in every plan and development has been a constant source of constructive suggestion. As their respective reports will show, our committees are making the progress the Association demands of us.

The Water committee, under the Chairmanship of Dr. John F. Norton, has, during the year, completed an important coöperative investigation of various types of selective culture media that had been suggested for use in the bacteriological tests. In addition certain chemical factors have been carefully studied. The results and recommendations will be presented in detail at this meeting.

The Committee on Dairy and Food Products, under the Chairmanship of Dr. Robert Breed, has been engaged in fundamental studies based chiefly upon the composition of the culture medium and the temperature of incubation used in the bacteriological examination of milk. The results of their work are so convincing that there is no doubt that the new methods elaborated should be adopted. This will involve changes in significance of numerical results and their interpretation and may even require amendment of milk codes and regulations. Even with the fundamental support of accurate laboratory demonstration such innovations will not gain general acceptance by mandate alone. Their adoption into current laboratory practice will result only from a persistent and carefully planned campaign of education, continued until those most concerned themselves demand the change.

It is fortunate that we have, in the chairman of our milk committee, a man competent, not only to recognize and develop more accurate laboratory analytical procedures but one also with the experience and judgment which enable him to organize the coöperative publicity required to bring about, in the most effective manner, general utilization of the new methods developed by his committee.

Accomplishments of the committee during the year will be described in detail by Dr. Breed and his referees. Their reports of fundamental studies will not, however, concern the milk program alone. Equally interesting and important progress has been made in the work upon the "Sanitary Oyster."

The reports already published by referees of Dr. W. D. Stovall's Committee on Diagnostic Procedures and Reagents illustrate the type of work that is being done by that group. The field being covered by this committee comprises all the routine technical procedures of the public health laboratory

(except, of course, those concerned with water and milk). The progress made during the year will be demonstrated by the contributions to be read at this meeting. It is predicted confidently that when Dr. Stovall has collected the approved reports of his referees he will have produced a laboratory manual equal in every way to the best publications of our Association.

As a result of the continuing policy of constant investigation and revision by referees who are outstanding in their special fields, our Standard Methods Committee reports maintain a unique position in laboratory literature.

In the chairman's report for last year it seemed necessary to refer to certain misunderstandings concerning the scope of our standard methods work. This year it seems unnecessary to refer to such discussions but merely to observe that there have been none.

At a meeting in Chicago, last December, Dr. Stovall asked several of the referees of his committee who were present to meet him at an informal conference. The discussion of work in which there was common interest proved to be most stimulating. As a result of that experience it has been decided to bring all Laboratory Section Standard Methods Committee members together at a dinner meeting this year. The purpose, of course, is chiefly that of making those who are creating public health laboratory history well acquainted with one another. It is not unlikely that this dinner conference will become one of the established features of subsequent Annual Meetings of the Association.

The only recommendation I have to make concerns the appointment of a new committee. Studies are being reported with greater frequency concerning the variable reactions of laboratory animals to experimental infection and to antigenic substances. There is already in the literature abundant information concerning the relative resistance of the species to infection and concerning differences in strains or breeds of the same animal species. Often we find it advisable to breed our own animals in order to have a pure line for special work. The ages and weights of animals most suited to the particular purpose are often exceedingly important. There are matters concerning the general care of laboratory animals which are not common knowledge. The same may be said concerning normal blood counts, anatomy, and physiology, as well as autopsy methods. Such information may be difficult to find at the time it is most needed and may require considerable literary research. We need to have it collected into a single volume by a group of referees best qualified and working together as our other Standard Methods Committees have been doing. It is recommended, therefore, to the council of the Laboratory Section that, in accordance with the rules and regulations governing Standard Methods Committees, a new committee be formed to be known as the "Standard Methods Committee on the Biology of Laboratory Animals," of the Laboratory Section.

As Chairman of the Coördinating Committee, I can express nothing but the deepest gratitude to all those with whom I have been in correspondence during the past year. They have made my labors very light—I have been on the receiving end throughout—and they have created a most optimistic belief in a productive future for our Laboratory Section.

A. Parker Hitchens, *Chairman*
Robert S. Breed
John F. Norton
W. D. Stovall
Friend Lee Mickle (*ex officio*)

Examination of Dairy and Food Products*

Present Status of the Report on Standard Methods for the Examination of Dairy Products—One of the most important activities of your committee during the past year has been the maintenance of contacts with other committees, sections, and associations interested in the development of laboratory methods for the examination of dairy products. There are so many of these that only the most important can be mentioned. Contact has been maintained with the work of the Association of Official Agricultural Chemists in the field of chemical analysis of dairy products and they have been urged to broaden the scope of their work to include methods for the detection of nutritionally important mineral elements in dairy products. Arrangements to include methods for the bioassay of milk have been made through the Food and Nutrition Section of this Association, and a report on these methods is to be given during the symposium on Standard Methods for the Examination of Dairy Products.

Through coöperation with the Committee on Bacteriological Methods of the International Association of Dairy and Milk Inspectors, a questionnaire has been distributed on the use now being made of the tentative Standard Methods for the Examination of Ice Cream. A report on this matter is to be made before the latter association at its annual meeting which follows immediately after the meeting of the American Public Health Association. At the same time, the chairman of your committee is to make a report on the efforts that are being made to bring about an international standardization of laboratory methods in the dairy field. International activities have led to the organization of a symposium on this subject which your chairman has been asked to open before the Second International Congress for Microbiology that is to be held in London in July, 1936.

A report on the work of the Standard Methods Committee for the Examination of Dairy and Food Products has also been given during the year before the Laboratory Section of the International Association of Milk Dealers, and before the American Dairy Science Association. Contact has also been established with the Committee on Standard Methods for Milk Analysis of the Canadian Public Health Association, and Committees on Research of the Ice Cream Manufacturers' Association, and of the American Association of Creamery Butter Manufacturers.

The secretarial assistance provided by the American Public Health Association has permitted us to maintain an active address list of the nearly 1,000 laboratories in the United States and Canada that utilize standard laboratory procedures for the examination of dairy products. Four reports and the questionnaire referred to above have been distributed to these laboratories during the past year.

Because of the demand for the inclusion of methods of making bacterial

* Report of the Standard Methods Committee.

counts for ice cream and for the inclusion of methods for the detection and microscopic examination of sediment in heavy cream and butter, and for making counts of yeasts and molds in butter, it is planned to broaden the scope of the next report. It has been suggested that the next edition should be called Standard Methods for the Examination of Dairy Products rather than to use the older title of Standard Methods of Milk Analysis. An Associate Referee to cover ice cream methods was appointed some time ago and Dr. E. H. Parfitt has recently been appointed Associate Referee to cover methods for the examination of butter. Their activities in this field are to be limited, as are the activities of the committee, to the development of methods that are useful in official control work.

During the year, several investigations that have a bearing on standard laboratory methods for the examination of dairy products have been completed under the general supervision of your committee, or by independent workers. The most important of these studies that are known to your committee are—

1. A study of the usefulness of samples of milk taken for bacterial analyses from weigh vats at receiving stations. (To be discussed at the meeting of the Laboratory Section of International Association of Milk Dealers.)
2. Further studies on the composition of standard agar.
3. Further studies on the optimum temperature of incubation to use in case an improved agar is selected.
4. Studies on methods of improving the standardization of the methylene blue reduction technic.
5. Studies on the efficiency of the tentative methods outlined for detecting organisms of the colon group in dairy products. (Reports on studies mentioned under 2, 3, 4 and 5 are to be reported at the symposium on Standard Methods for the Examination of Dairy Products.)
6. Studies on the significance of the presence of organisms of the colon group in samples of raw milk that are not more than 4 hours old. (To be reported at the meeting of the International Association of Dairy and Milk Inspectors.)
7. Studies on the usefulness of the colon test as a means of detecting inefficient pasteurization. (To be reported at the New York State Dairy and Milk Inspectors' Association, and at the International Association of Milk Dealers.)

It is expected that the next edition of the *Standard Methods for the Examination of Dairy Products* will utilize the conclusions reached in these or subsequent investigations in the same field.

The reports by Dr. Hagan on methods of detecting tubercle bacilli in milk and by Dr. Huddleson on methods of detecting Brucella organisms in milk (*Year Book, 1934–1935*) have been favorably received and it is planned to include these with slight modifications in the next edition of the milk report.

Present Status of the Shellfish Report—The revision of the 1922 first edition of Standard Methods for the Examination of Shellfish, prepared by a Committee of which the late Professor Gorham was chairman, was approved by the Laboratory Section at Pasadena in September, and by the Committee on Research and Standards of the Association in December, 1934, for use as a basis for further revision. This second edition of the 1922 report has not been published, but has been distributed in mimeographed form with a questionnaire to all persons in the United States and Canada believed to be interested in a revision of methods. A conference of interested persons was held in Washington, D. C., at which a compilation was made of answers to a questionnaire sent out by Dr. C. A. Perry. A symposium on this general subject has been arranged for the Milwaukee meeting and this compilation will form an important part of the progress report to be given at that time.

General—The work of the committee has been greatly facilitated by the pro-

vision made by officers of the Association of funds which have permitted the holding of a conference on Dairy Products Methods at Geneva, N. Y., April 8, 1935, and a conference on the Shellfish Report held jointly with representatives of the Food and Nutrition and Public Health Engineering Sections at Washington, D. C., April 18, 1935. The first printing of 2,000 copies of the Sixth Edition of the Milk Report was sold out during the year and the report was reprinted in an edition of 3,000 copies. This edition is expected to last until 1937 at which time it is planned to present the manuscript of a new edition for approval by the Section and the Association.

ROBERT S. BREED, *Chairman*

Referee for:

Methods of Detecting Specific Types of Bacteria in Dairy Products, MAC H. MCCRADY
Methods of Counting Bacteria in Dairy Products, A. H. ROBERTSON
Chemical Methods of Examining Dairy Products, F. C. BLANCK
Shellfish Examinations, C. A. PERRY

Associate Referee for:

Methods of Identifying Streptococci in Dairy Products, G. J. HUCKER
Bacteriological Methods for the Examination of Ice Cream, F. W. FABIAN
Milk Sediment Test, CARYL C. CARSON
Methylene Blue Reduction Test, H. R. THORNTON
Methods of Examining Milk for Tubercle Bacilli, W. A. HAGAN
Methods of Examining Milk for Evidences of Brucella Infection, I. FORREST HUDDLESON
Microbiological Methods for the Examination of Butter, E. H. PARFITT

Examination of Shellfish for Fecal Pollution*

A Revised Bacteriological Procedure

THE present method for bacteriological examination of oysters for fecal pollution has been severely criticised by many of those who have given extensive and studious consideration to it. This method was the outgrowth of studies begun by a committee of the American Public Health Association and reported on in 1912 and 1916. The method was finally adopted by the Laboratory Section at San Francisco in September, 1920, and published in Volume 21 of the official JOURNAL of the Association in 1922. Minor changes, particularly in the phraseology of the method, were made by Professor Gorham at Washington in 1922, but these changes did not make the method any more suitable for its primary purpose of measuring fecal pollution and did not, consequently, satisfy the growing criticism.

A mimeographed revision of the 1922 standard procedure was distributed with a questionnaire on February 10, 1935. Seventy copies of the method and questionnaire were sent to all persons in the United States and Canada known to be interested. Fifty-three of these were sent to individuals in 40 different laboratories and to 17 other persons thought to be interested in an official method for the examination of shellfish. Twenty-five questionnaires were returned with answers to some or all of the questions while 10 persons sent replies by letter who did not consider themselves qualified to answer the questions. It may be assumed, therefore, that the replies to this questionnaire represent the attitude of those who have had most experience with the present standard method. The replies to the questionnaire were compiled in as brief a manner as possible as a basis for further criticism.

A conference of some of those actively interested in a new standard procedure for shellfish was held at the Army Medical School in Washington, D. C., on April 18, 1935. A very free discussion of the problem of new standards took place. Summaries of the answers to the questionnaire were used as a basis for criticism and discussion. A copy of the report on this conference and of the questionnaire, together with the summary of the replies to the questionnaire, was immediately sent to interested persons for their further criticism.

APPROACH TO NEW PROCEDURE

The guiding policy in formulating a new procedure has been first to determine the attitude of those who have had extensive experience and particularly those who have given studious thought to the matter, secondly to review these attitudes critically and finally, with this background, to attempt to evolve a procedure.

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* Progress Report of the Referee on Shellfish Standards for the Committee on Standard Methods for the Examination of Dairy and Food Products.

PRIMARY PURPOSE OF A PROCEDURE

It is obvious to all that the primary purpose of a standard procedure is to provide a method whereby the best possible knowledge may be had of the amount of fecal pollution in shellfish. The chief danger is typhoid fever. Lesser hazards are other enteric infections such as bacillary dysentery, paratyphoid fever, and cholera. It is also thought by some that there is a danger in transmitting other infectious diseases such as tuberculosis, syphilis, and skin infections, if people with these infections open shellfish. Physical and laboratory examinations for these diseases are, however, made routinely on employees in shellfish establishments, and it is not necessary to provide any special procedure for this purpose. The purpose, therefore, of this report, is to determine a procedure whereby the freedom of oysters and other shellfish from possible enteric organisms may be estimated.

It has not been considered necessary to publish the full report of the author in which the evidence both in favor of these and other minor changes, and that opposed to them was given. Since the part dealing with the proposed use of *Escherichia coli* rather than the colon group represents a more fundamental change than any other, and since the reasons for this change are of interest to many besides those interested in shellfish standards, this and a few other parts of the paper believed to be of general interest are given below.

The fact that the colon group has been found to be of so little value in estimating fecal pollution in oysters has made it mandatory that a more satisfactory index be found. The fact that *Escherichia coli* is the one member of the colon group which is generally accepted as an unquestionable and typical fecal type, and the fact that this organism has not been found to any extent in oysters, even those giving exceptionally high scores, unless such oysters were known to come from polluted areas, has naturally led many to believe it would be more satisfactory for this purpose. An impasse has been reached where it would seem that either some more suitable indicator of significant fecal pollution must be found, or the bacteriological examination of oysters must remain in a position of very questionable value, and be abandoned or discredited by many able workers. The use of scores based on the colon group as an indicator of pollution in oysters directly from their beds is already obsolete in Maryland and Canada. In this connection it is of interest and value to know that *Escherichia coli* was adopted by an international conference on a standard procedure for the examination of edible mollusks at Middleburg, Holland,[1] in September, 1932. Typical *Escherichia coli* is described as (1) a Gram-negative, nonsporing bacillus, (2) producing acid and gas from lactose, and (3) glucose, (4) producing indol, (5) giving a positive methyl red, (6) a negative Voges-Proskauer test, and (7) failing to grow in Koser's citrate medium. These are precisely the characters recommended by the writer [2] in 1928.

Realization of this situation has been the impetus which has resulted in a study for a practical method for the determination of *Escherichia coli* in Maryland. The fact that oysters, taken from sources of unquestionable purity as judged by sanitary surveys and bacteriological examination of the oyster waters, would frequently have excessively high scores during the warm summer and fall months together with the fact that the bacteria responsible for such scores were found to be almost exclusively *Aerobacter cloacae, Citrobacter sp., Aerobacter aerogenes*-like types and various intermediate colon group types to the exclusion of the

universally accepted fecal type, *Escherichia coli*[2, 3] indicates that the scores of oysters would be more significant if based on *Escherichia coli.* Not only is this true for shell oysters taken directly from their beds but it is a well established fact that in many instances the same type of colon flora is found in shucked oysters.

Since there is general agreement among bacteriologists that *Aerobacter cloacae* is one member of the colon group which is seldom found in human stools and is, therefore, generally accepted as not being a fecal type, and since this organism so often composes a large part of the colon group responsible for the type of high scores referred to,[2] there can be little objection to referring to the non-*Escherichia coli* members of the colon group in oysters as non-fecal types. It is obvious, therefore, that such non-fecal types find a natural habitat in oysters where a suitable food environment exists. Such forms are frequently the cause of excessively high scores in shucked oysters and undoubtedly are the cause for numerous complaints, investigations, and rejections where, as a matter of fact, they are probably without significance as indicating fecal pollution. They are found in large numbers in the dirt from unsanitary utensils, and easily increase in oysters if kept at comparatively warm temperatures. They may be present in large numbers to start with, and being able to tolerate a higher acidity than *Escherichia coli* they are, apparently, more characteristic of spoilage. This is the situation that has convinced many that *Escherichia coli* would be a more satisfactory index of fecal pollution in oysters.

In this connection it is of interest to review the attitude of those answering this question in the questionnaire and to know the attitude as expressed at the Washington conference. Of 24 persons answering the question, 14, or 57.3 per cent, favored the use of *Escherichia coli,* while 2 others, making 66.7 per cent, favored its use along with the colon group. Five, 21 per cent, favored the use of the colon group, while 3 others, a total of 33 per cent, considered the use of *Escherichia coli* impractical.

A very free discussion of this question took place at the conference and great interest in the problem was evident. In view of the acknowledged very limited value of the scores of oysters as now based on the colon group and the conviction that many members of this group are without significance from the standpoint of fecal pollution, the general opinion of the conference was in favor of using *Escherichia coli,* provided a satisfactory technical procedure could be developed.

In realization of the fact that scores based on the colon group are of no practical value, routine examinations for *Escherichia coli* (so-called fecal scores) rather than the colon group were instituted in Maryland in May, 1934. A great deal of work has been done since 1928 in the development of the Eijkman test[2] in the Maryland bacteriological laboratories because this seemed to offer the most practical approach to the problem of isolating *Escherichia coli.* A new Eijkman medium was developed and reported in 1933.[4] A report on the practical application of this test in the examination of oysters, crabmeat, and other substances was made in the JOURNAL of this Association in June, 1935.[5] A further report of the application of the test to the isolation of *Escherichia coli* from sewage appeared in the *Journal of Bacteriology.*[6]

Since the use of *Escherichia coli* seemed to be the key to the development of a new shellfish procedure, and since considerable work had been done in Maryland for some months, the services of Dr. Milward Bayliss were

secured for 2 months from funds provided by the Committee on Research and Standards to help compile the Maryland data. It was planned to include other data but these could not be secured.

The Maryland data were compiled to demonstrate what correlation, if any, there might be between pollution as estimated from sanitary survey information and pollution as indicated by *Escherichia coli* and by the colon group. A short report of these observations with charts has been submitted for publication in the *Journal* of the Association. Data were compiled for 4 rivers in Maryland, and a single table for all *Escherichia coli* data available has been prepared. In brief, these data indicate a close correlation between the estimated degree of fecal pollution as judged by sanitary surveys and as indicated by *Escherichia coli* densities in oysters, while there is little or no such correlation on the basis of the colon group. For the oyster producing waters there is a much closer correlation between observed pollution and the colon group, but even here there appears to be a much better one on the basis of *Escherichia coli.*

The Maryland data are too limited to warrant dogmatic conclusions but they justify further study.

STANDARD PROCEDURE FOR EXAMINING SHELLFISH WATERS AS WELL AS SHELLFISH

Practically all of those replying to the question, " Should a standard procedure for shellfish include one for shellfish waters? " indicated that a procedure for examination of the waters should be a part of standard methods for the examination of shellfish. Two only, felt that since the Association already has standards for the examination of water this should not be included. The principal reasons why a separate procedure is needed may be listed as follows:

1. The present standard method has been developed for drinking water; it has not been found satisfactory for estimating the quality of water suitable for growing shellfish.
2. Most of those concerned with the shellfish problem believe that *Escherichia coli* rather than the colon group would be a more suitable index of the type of pollution with which they are concerned.
3. There is general agreement that the same bacterial index of pollution should be used both for shellfish and shellfish waters.

The sentiment of the conference was in accord with the above summary of the attitude of those answering the questionnaire. The Maryland data on the relative value of *Escherichia coli* and the colon group support these points.

RECOMMENDED LIMITS FOR POLLUTION

The opinions of those with experience in shellfish control work differ sharply on the question of whether limits should be defined for pollution.

About two-thirds (15) of those an-answering this question favored the adoption of bacterial limits. A number indicated that such bacterial limits, however, should be based on *Escherichia coli.* Six were opposed to the established bacterial limits.

The opinion voiced at the conference was in opposition to stringent definition of standards. It approved, however, the inclusion of certain carefully phrased recommendations made on limits for pollution arrived at by those responsible for official control work.

In so far as procedure and limits of pollution are so intimately a part of each other, in so far as those who are best qualified to arrive at a desirable standard procedure are probably also best qualified to judge the significance of the practical application of this pro-

cedure, and in so far as a number of those concerned with the problem of evaluating bacterial results and determining pollution desire advice in this matter, the adoption of some sort of guide would seem to be useful. Such a recommendation should, however, follow the application of the new procedure in a relatively large series of examinations made on shellfish and shellfish waters of various degrees of pollution.

USE OF WHOLE OYSTER RATHER THAN SHELL LIQUOR

The question of whether an examination of shell liquor gives a proper idea of pollution in oysters and other mollusks has received considerable thought in this country, in England, and elsewhere. In Japan,[7] the American procedure has been used and will be adopted with certain modifications, chiefly the use of the whole oyster rather than shell liquor. In Germany,[8] there is no standard procedure and examinations by one of two private companies are confined to direct microscopic examinations of stained tissue for spoilage. In England, there are likewise no standard procedures comparable to those of the United States. The Bacteriological Standards of the Worshipful Company of Fishmongers [9] are, however, almost tantamount to such standards. Their procedures have been reviewed and approved by representatives from the Royal Society, and the Oyster Merchants' and Planters' Association, as well as from the Ministries of Health and of Agriculture and Fisheries in 1924. The procedures represent the long experience and thought of Sir Alexander Houston, Dr. Klein, Professor Eyre of the Fishmongers Association, Sir Frederick Andrewes of the Royal Society, and Professor R. Tanner Hewlett, representative of the Oyster Merchants' and Planters' Association. A most important point in the procedure is the use of the whole oyster. This procedure has, however, recently been superseded in reality by the recommendations of the Middleburg conference.

It is pertinent that under the auspices of the Conseil International pour Exploration de la Mer [1] at a conference held at Middleburg, Holland, in September, 1932, a standard method for the bacteriological examination of edible mollusks was considered. This conference was represented by delegates from Belgium, England, France, Germany, Holland, Irish Free State, and Portugal who were for the most part experts in this type of work. The procedure adopted by this conference is excellent in most regards and should receive careful consideration in the formulation of our own revised methods. It is noteworthy in connection with the point under discussion that the procedure adopted calls for discarding the shell liquor and using only the minced bodies of the mollusks. While a question may be raised on the validity of discarding the shell liquor, all evidence indicates the soundness of using the minced body of the oyster.

In the United States, the relative merits of using the whole oyster rather than the shell liquor for examination have been investigated particularly by Dowd and Glancy [10] of the Pease Laboratories, by Tarbett [11] of the U. S. Public Health Service, and, more recently, by the author and a member of his staff.[12] None of the results of these studies have been published, but the writer has had an opportunity to review the work of Dowd and Glancy and is familiar with Tarbett's conclusion that the whole oyster should be used. The studies made in Maryland confirm Tarbett's conclusion. The answers to this question in the questionnaire were not very conclusive, an equal number favoring the use of the whole oyster and the continued use of the shell liquor. The opinion of the

conference was strongly in favor of the use of the whole oyster.

USE OF MOST PROBABLE NUMBER VS. THE SCORE FOR EXPRESSION OF RESULTS

The score method of expressing the number of colon group bacteria in oysters has been subject to considerable criticism. While there is now general familiarity with oyster scores among those concerned with the sanitary control of shellfish, and there might consequently be some objection to changing a system so well established, yet this argument is not entirely valid. In the first place, of 22 persons expressing their attitude on this point in the questionnaire, only 9, or 41 per cent, favored retention of the score system against 13, or 59 per cent, who favored the use of most probable numbers. Those attending the conference were also in favor of expressing results as most probable numbers. A point of practical consideration is the association of certain scores, particularly a score of 50, as indicative of significant pollution. While such associations have been discredited, yet the association will remain in many minds for a long time. The transition to a new basis for measuring pollution as *Escherichia coli* will of course necessitate new standards. It is believed that this transition can be effected much better if results are expressed in most probable numbers. The score system is already obsolete in several places, notably Canada and Maryland where results are expressed as most probable numbers, and the score system is used in Maryland only for interstate purposes. It is proposed, therefore, that results for both shellfish and shellfish waters be expressed in terms of most probable numbers.

SUMMARY

On the basis of a questionnaire, conference, and consideration of studies made both in the United States and certain foreign countries, the following principal changes in the present standard procedure for the examination of shellfish are proposed.

1. A new procedure should include at least, such edible mollusks as oysters, clams, and mussels.
2. *Escherichia coli* rather than the colon group should be the index of pollution for both shellfish and shellfish waters.
3. A new procedure should include methods for the examination of shellfish waters as well as shellfish.
4. The whole oyster rather than just the shell liquor should be examined.
5. *Escherichia coli* results should be expressed as most probable numbers rather than as a score.
6. Certain recommendations should be made in regard to amount of pollution which should ordinarily be tolerated.

A procedure incorporating these principles has been drawn up for trial during the ensuing year, during which time it is hoped its value for testing oysters, clams, and mussels may be determined and such changes made in it as will best adapt it to the requirements of practical application.

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C. A. PERRY, *Referee*

Procedures for the Detection of Brucella in Milk*

EXAMINATION OF MILK (COW, GOAT AND SHEEP) FOR BRUCELLA AGGLUTININS

Collection and preparation of milk samples—Milk samples are collected, preferably from individual quarters of the udder, in clean test tubes or vials. The strippings should never be used. The tubes should be filled to only one-half their volume. Let the samples stand from 6 to 8 hours to permit the cream to separate. Remove as much of the cream as possible with a pipette. Add rennet (1 per cent solution), allowing 2 drops for each 5 c.c. of milk, to each tube of milk, and mix thoroughly. The tubes may be placed either in an incubator at 37° C. or in warm water at the same temperature. If the tubes are placed in a slanting position, the curd will settle to one side, and the clear milk serum with which the test is to be made will separate in about 2 hours. In order to obtain a serum free from particles of casein, the samples should be placed in an icebox or cold place for from 6 to 8 hours before testing. Sour and decomposed milk should not be used, as the results are not reliable. Neither should milk be used in which the curd has become partly digested as this interferes with the test. Colostrum is unsatisfactory because of the difficulty of separating the serum and the possible occurrence of nonspecific agglutinins.

The Agglutination test—One may choose either of two methods, namely the test tube or rapid agglutination test.

Test tube method—A smooth strain of *Brucella abortus* is grown on liver agar slants for 48 to 72 hours at 37° C. The growth is removed and suspended in physiological salt solution containing 0.5 per cent phenol. The final turbidity of the suspension should measure 7 cm. by the Gates wire loop method. Place 2 c.c. of the antigen into a series of 5 agglutination tubes. To the first tube add 0.08 c.c. of milk serum, the second 0.04 c.c., the third 0.02 c.c., the fourth 0.01 c.c., and to the fifth 0.005 c.c. These amounts of milk serum added to 2 c.c. of antigen will give approximately, dilutions of 1–25, 1–50, 1–100, 1–200, and 1–400. No further dilutions are necessary in making routine examination of milk for *Brucella* agglutinins.

Serum and antigen are mixed thoroughly in the tubes and incubated for 48 hours in a 37° C. room.

The following system may be used in recording changes in the stability of the antigen: + = complete sedimentation; P = incomplete sedimentation; — = no sedimentation. The presence of infection in the udder is indicated by complete agglutination in a 1–50 dilution or above of serum.

Rapid agglutination test [1]—The rapid agglutination test offers a simple and accurate method of detecting *Brucella* agglutinins in milk from any species of animal infected with any one of the three species of Brucella.

Materials needed — (1) darkfield illumination box and glass plate ruled into squares; (2) 0.2 c.c. pipettes graduated in 0.01 c.c.; (3) clean toothpicks for mixing milk serum and anti-

* Supplementary report of the Associate Referee on Methods of Examination of Milk for Evidence of Brucella Infection, for the Committee on Standard Methods for the Examination of Dairy and Food Products.

gen; (4) properly standardized antigen and standardized dropper pipette.

Technic—In beginning the test, arrange the serum samples in a row parallel with the darkfield illumination box. The glass plate, with the etched squares upward, is placed over the opening of the box and the identification number of the serum sample marked with a wax pencil on either the top or bottom of the row of squares used.

With a clean 0.2 c.c. pipette, draw up serum from the first milk sample to the zero mark on the pipette. Beginning in the bottom left hand square of the plate, place the following amounts of serum in the succeeding squares toward the top: 1st square, 0.08 c.c.; 2nd square, 0.04 c.c.; 3rd square, 0.02 c.c.; 4th square, 0.01 c.c.; 5th square, 0.005 c.c.

This manner of placing the serum brings the smallest amount farthest from the heat of the electric bulb in the box, reducing the rapidity of drying of the smallest amounts of serum. The procedure is continued, using the next set of vertical squares and a separate pipette for each sample. The best results are obtained by testing only 4 or 5 samples at a time as otherwise the small amounts of serum dry out too much before the test is completed.

If the pipette has been placed deep in the serum, there will be some serum which will collect on the outside at the tip. For accuracy, this should be removed by touching the tip of the pipette against the lip of the vial.

After thoroughly shaking the bottle of antigen, remove a dropper full of the antigen. Holding the dropper in a vertical position, add one drop to each amount of serum on the plate. Care should be taken to hold the dropper in a vertical position since holding it at another angle will make a considerable difference in the amount of antigen delivered. Always replace the dropper directly in the vial of antigen.

Then with a clean toothpick mix the serum and antigen, using a new toothpick for each sample. Always start at the top of the plate in the square containing the smallest amount (0.005 c.c.) of serum and continue downward to the largest amount. Spread the mixture over about three-fourths the area of the square without coming in contact with the etched dividing lines.

Immediately after the samples have been mixed, remove the plate from the box and tilt slightly backward and forward slowly for about 5 minutes. Place the plate on the box, turn on the light, and record the results.

The reactions stand out very clearly. It is not difficult to distinguish between complete clumping of the antigen and different degrees of incomplete clumping. A negative serum causes no flocculation of the antigen. There are often encountered, however, sera which produce a trace of flocculation in the 0.08 c.c. amount.

Immediately after using, the pipettes should be rinsed several times with fresh water until thoroughly clean. Then boil in distilled water and drain all the water out before using again. The glass plate may be cleaned with cleaning powder and brush, after which it is rinsed with distilled water and dried. By having several clean plates available, one can proceed with the testing of additional samples without delay. Absolute cleanliness of glassware is essential.

Interpretation of the test—Rapid antigen has been standardized for use with undiluted serum in the following amounts: 0.08 c.c., 0.04 c.c., 0.02 c.c., 0.01 c.c., and 0.005 c.c.

In the test tube method, when these amounts of serum are added to 2 c.c. of antigen (turbidity 7 cm. by Gates apparatus), the following respective approximate dilutions are obtained:

1–25, 1–50, 1–100, 1–200, and 1–500.

The antigen has been standardized so that the titer of the agglutinins in a given serum will be parallel in the two methods. Therefore, in the rapid test, complete agglutination with the various amounts of serum represents the following titers: 0.08 c.c., 1–25; 0.04 c.c., 1–50; 0.02 c.c., 1–100; 0.01 c.c., 1–200; 0.005 c.c., 1–400.

If one desires to employ quantities of serum different from those just mentioned it will be necessary to standardize the antigen for the amounts in question. It is important to acquire an accurate knowledge of reading the test. If possible, a visit should be made to a laboratory conducting the test to obtain assistance in reading and interpreting the different degrees of agglutination.

The interpretation of the different degrees of agglutination in terms of infection is still a debatable question. One should conform to the interpretation placed on the test by the regulatory or sanitary authorities of the state in which the test is conducted.

The presence of infection in the udder is indicated by complete flocculence of the antigen with 0.04 c.c. of milk serum. In the case of a composite milk sample, infection is indicated when flocculence occurs with 0.08 c.c. of serum.

Differentiation of the Species of Brucella—It is important that one be thoroughly familiar with the peculiar growth characteristics of the Brucella group and the methods that have been successfully used in their differentiation, before an attempt is made to identify the species of a newly isolated strain. It is advisable for those laboratories which isolate cultures at wide intervals to forward new cultures for their identification to laboratory workers who have had considerable experience with the Brucella group.

There are five methods that have been used successfully with certain limitations, for the identification of the species of Brucella. The agglutinin-absorption method was used first by Feusier and Meyer [9] for this purpose. It was studied more exhaustively by Evans [10] and by Wilson and Miles.[11] It is a valuable method for distinguishing *Brucella abortus* from *Br. melitensis* if the technic employed by Wilson and Miles [11] is followed, otherwise it will fail to distinguish one from the other in certain instances. The agglutinin-absorption method is not a reliable one for distinguishing rough strains of melitensis from rough strains of abortus nor will it separate *Br. suis* from *Br. abortus*.

If one is desirous of using the agglutinin-absorption method in determining whether a strain belongs to the abortus or melitensis group, it is recommended that the technic of Wilson and Miles [11] be followed.

The glucose utilization method, first applied and recommended by McAlpine and Slanetz [12] for identifying the species of Brucella, has not found general acceptance by many other workers.

The difference in the nitrate and nitrite reducing ability of the species of Brucella has been made use of by Zobell and Meyer [13] as a means of distinguishing one from the other. Their results obtained by this method have been confirmed by the writer. The method should be employed, wherever possible, in determining the species of a newly isolated culture.

The difference in the hydrogen sulphide metabolism of the three species of Brucella has been made use of by the writer [1] in distinguishing one species from the other regardless of their source or whether the culture is smooth or rough. There is one group of strains the writer and others have studied which cannot easily be identified by the H_2S metabolism method.

They are the Danish strains of *Br. suis*. These strains do not produce H_2S to the same degree that other strains of *Br. suis* produce.

A method [1] which makes use of the difference in growth behavior of the species of Brucella toward certain aniline dyes in a solid medium has been generally accepted as the most satisfactory for identifying the species to which a given culture belongs.

The following technic should be followed in using the dye plate method for identifying the species of Brucella: The medium used is prepared according to the formula given at the end of this section. The pH is adjusted to 6.6. The adjustment should be made just before the dyes are added, as liver infusion medium does not always remain at the pH to which it was previously adjusted if it is heated afterward. This point should be observed closely if successful differentiation of the species is to be obtained. A medium of higher or lower pH gives such confusing results that perfect differentiation is impossible.

The dyes which have been found to give consistent results in the differentiation of the three species are thionin and basic fuchsin. They are certified dyes, made by the National Aniline and Chemical Company.

The dyes are prepared in a 1 per cent stock solution or suspension in sterile distilled water. They are not readily soluble in water in this concentration. The stock solutions appear to keep indefinitely. The final dilution which should obtain for thionin is 1:50,000 and for basic fuchsin 1:25,000. These dilutions are based on the actual amount of the original dye in the medium.

The dye suspensions should be heated in flowing steam for 20 minutes, shaken well and, while still hot, added to the melted medium before it has time to cool. This procedure results in a more uniform mixture of the dye suspension and a more uniform distribution of the dyes in the medium. The medium and dyes are thoroughly mixed and immediately poured into Petri plates. The plates are placed in a 37° C. incubator until the water of condensation disappears.

The plates may be divided into three or more sections to accommodate the growth of several strains of the organism. The seeding of the plates is accomplished with a loop of a heavy suspension of a 48 to 72 hour agar slant growth. The suspension may be obtained by working up a portion of the growth in the water of condensation at the butt of the slant or by adding a small amount of sterile broth or sterile saline solution to the slant. It may be stated here that the dyes do not kill the organism, but merely inhibit its reproductive function; so if masses of the culture are streaked over the surface of the plates, slight growth is very apt to occur at those points where the seeded mass has not been evenly distributed.

The seeded plates are incubated aerobically at 37° C. for 72 hours, or in 10 per cent CO_2 when newly isolated bovine strains are used. At the end of the period of incubation one will find that strains of the abortus species have grown only on the medium containing basic fuchsin; those of the suis species have grown only on the medium containing thionin; and those of the melitensis species have grown on each of the media. The growth of the last species, however, is as a rule never as luxuriant as that of the other two species.

PREPARATION OF LIVER AGAR MEDIUM [1]

The medium is prepared as follows: Fresh beef liver, free from fat, is ground in a meat chopper to a plastic mass. One pound of the liver and 500 c.c. of tap water are placed in a con-

tainer and mixed well. The container is covered and placed in flowing steam for 20 minutes. Remove the lid and stir with a glass rod in order to mix thoroughly so that all parts are reached by the heat. The heating is continued in flowing steam for 1½ hours. Remove and filter through a wire screen. The infusion thus prepared is made into a solid medium or infusion broth.

To prepare one liter of liver infusion agar, measure out the following ingredients:

Washed agar	20 gm.
Tap water	500 c.c.
Liver infusion	500 c.c.
Peptone (Bacto)	10 gm.
Sodium chloride C.P......	5 gm.

Place all ingredients in a suitable container, cover and place in flowing steam for 1 hour. Remove and cool to 60° C. Adjust the pH at this time to 7. Place in flowing steam again for ½ hour. Decant and place in sterile flasks or tubes and sterilize at 15 lb. pressure for 30 minutes. The reaction of the medium during the process of sterilizing will usually drop to or near pH of 6.6. In the writer's experience the organisms grow best at or near pH of 6.6. The final medium prepared according to the foregoing method will not be clear, but this will not interfere with its use as a medium. The final product may be freed from sediment and suspended particles if it is passed through a Sharples centrifuge before sterilization.

Liver broth for blood culture or other use may be prepared in the same way.

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I. FOREST HUDDLESON,
Associate Referee

Examination of Water and Sewage*

THE committee this year offers definite recommendations for changes for the Eighth Edition of *Standard Methods for the Examination of Water and Sewage.* While the definite proposals will be recommended for action in a later business meeting of the Laboratory Section, it seems desirable to present before this meeting some discussion of these specific changes, together with more general considerations, which, although of an editorial character, should be brought to the attention of those interested in water and sewage analysis. Most of the proposed changes were anticipated in the report presented in 1934.

A rearrangement of material in the various Parts of the book is made necessary by the inclusion of more complete procedures for sewage analysis and for boiler water examination, in order to place the methods in the sections to which they are most applicable and to avoid repetition.

Part I will contain the procedures most frequently used in sanitary chemical analysis.

Part II will include methods more often used in mineral analysis, together with the new section on boiler water analysis, and the present section containing rapid methods which are used primarily in railroad laboratories. It is of course impossible to avoid some arbitrary decisions in assigning the procedures on this basis.

The methods for dissolved oxygen and oxygen consumed have been transferred to Part III which deals with sewages and sewage effluents and has been prepared by a committee from the Sewage Works Association. Part IV contains methods for the analysis of sludge, etc.

Parts V and VI deal with microscopic analysis, and Part VII includes the bacteriological methods. Certain procedures now contain rather rigid specifications for laboratory apparatus. It has seemed convenient to gather this material in one section.

The more important changes in methods will be discussed.

The determination of odor has been completely revised and now includes the so-called "threshold" method, embodying the ideas of Spalding as recommended by Fair and his associates, and an optional air dilution test.

More discussion has been aroused by the present procedure for estimation of chlorine than by any other of the chemical analyses. This has led to a complete revision of the procedure and its modification to allow for the numerous interfering substances. In the presence of relatively large amounts of nitrite nitrogen and manganic compounds the ortho-tolidine method is unusable, so that an iodine procedure has been added.

In the western part of the country it is sometimes necessary to determine the borate content of a water. The method now in Appendix II has been used in extensive studies by the Los Angeles Water Department and found sufficiently satisfactory to warrant the recommendation that it be included as a standard procedure. Two other determinations should also be similarly transferred: The nephelometric method for zinc, and the DeBoer method for fluorides by the use of the zirconium-alizarin reagent.

* Report of the Standard Methods Committee.

For some time the various committees in charge of revising Standard Methods have hoped to include more accurate procedures applicable to boiler water analysis. This section has been prepared under the direction of S. T. Powell and includes the methods recommended by the American Society for Testing Materials.

The procedure for microscopic methods has been revised and a table has been placed in the Appendix to give suggestions for interpretation of results.

In the paper presented by Mr. Ruchhoft, the basis for changes in bacteriological methods has been discussed. The large amount of laboratory data involved has been obtained in a coöperative investigation under Mr. Ruchhoft's direction, and the committee is highly appreciative of the interest and coöperation of the more than 20 laboratories involved. Various media were studied on the basis of their growth promoting properties for the coli-aerogenes group and their inhibitive action toward anaerobes. Much of the latter work was done by Dr. R. S. Spray. From the data obtained, certain media were selected for use in a confirmatory test for the coli-aerogenes group. None of the special media studied were considered satisfactory to supplant lactose broth for primary inoculation with portions of water samples but are satisfactory for confirmation. It is hoped that this new procedure will materially shorten the present standard method and will give results equally satisfactory from a sanitary standpoint.

The entire section on bacteriological methods has been carefully revised, and a new schematic outline prepared. The most important changes in these methods are those dealing with the detection of organisms of the coli-aerogenes group. It is proposed to recognize 3 tests—presumptive, confirmed, and completed. No change is recommended in the presumptive test except that tubes showing gas after 48 hours should be confirmed rather than completed. The confirmed test may be done either by the use of Endo or eosin-methylene blue plates, as at present, or by the use of one of 4 confirmatory media:

Brilliant Green Bile
Crystal Violet Lactose Broth
Fuchsin Lactose Broth, or
Formate Ricinoleate Broth

The formation of gas in any one of these media following the formation of gas in a lactose broth tube will constitute the confirmed test. No change has been made in the completed test except that completion may be made from a confirmatory medium as well as from Endo or eosin-methylene blue plate. It is desirable, but not required, in selecting the confirmatory medium that the medium be studied in relation to the particular water supply under examination, and that the one be chosen which gives the most satisfactory correlation with the completed test.

One addition has been made to the committee since last year. Dr. W. L. Mallmann has been added as a member in charge of methods for swimming pool examination. In general, these methods would follow those of sanitary water analysis, but it is well known that certain precautions must be taken in collecting samples from chlorinated pools. Inasmuch as Dr. Mallmann is the Laboratory Section representative on a committee of the Public Health Engineering Section, it is not possible to include his report in the main body of the text of *Standard Methods* until a report is approved by the committee. However, his suggestions will be included as an Appendix to *Standard Methods*.

Below are the definite recommendations of the committee:

Proposed Recommendations for Presentation to the Laboratory Section by the Coördinating Committee and Relating to the Eighth Edition of Standard Methods for the Examination of Water and Sewage

As in the past, these recommendations include only proposed changes which are fundamental in character, *i.e.*, new methods which the committee recommends for inclusion in the Eighth Edition and fundamental changes in present methods. Since the new manuscript must be approved, both by the Coördinating Committee and the Committee on Research and Standards, it is believed that sufficient safeguards exist over proposed changes of an editorial character.

The following changes and additions are recommended:

1. The addition of a section dealing with laboratory apparatus, this section being a compilation of specifications already included in the text under various methods of analysis.
2. The use of milliequivalents per liter in figuring chemical constituents in addition to parts per million.
3. The so-called "threshold" method for detecting odors in water, essentially that proposed by Fair. The air dilution method is an optional procedure. This involves the use of more descriptive terms than at present employed, together with the use of code letters.
4. A revision of the test for chlorine, involving a modification of the time allowed for color development. This will be not less than 5 minutes and not more than 15 minutes, with the provision that a less time may be used under special circumstances. Where interfering substances are present, procedures will be given in the appendix.
5. The carbamate method for the examination of copper in place of the electrolytic procedure.
6. The deletion of the present method for tin.
7. The method for estimating zinc now given in the Appendix (nephelometric ferrocyanide method).
8. The method for boron now described in the Appendix (electrometric).
9. The DeBoer Method for estimating fluoride (colorimetric with zirconium-alizarin reagent).
10. Perchloric acid method for potassium.
11. The method for determination of iodide now given in the Appendix (colorimetric with nitrosyl-sulphuric acid reagent).
12. The elimination of the method for oxygen consumed in Part I of the book and the transfer of this procedure to Part III dealing with sewage analysis, leaving an appropriate cross-reference.
13. Transfer of the determination for dissolved oxygen from the section dealing with water analysis to the section dealing with sewage analysis with appropriate cross-reference.
14. A determination for total solids in brines. Drying at 750° C.
15. Permission to use other than specified indicators in alkalinity.
16. Addition of a colorimetric method for silica (ammonium molybdate).
17. Phosphate method now in Appendix (precipitation as phosphormolybdate and as magnesium ammonium phosphate with ignition—Scott method).
18. A section entitled, "Analysis of Stationary Boiler Water Supplies"; this section to include the following new determinations:

Strontium chloride method for hydroxide.

Barium chloride and carbon dioxide evolution methods for carbonate.

Benzidine and tetrahydroxyquinone methods for sulphate.

Colorimetric method for phosphates (aminonaphtholsulfonic acid).

Dissolved oxygen—a modification of the Winkler procedure to detect small amounts of oxygen.

Sulphite (iodine titration).

Cross-references have been used for methods in other sections of the book.

19. The adoption of the methods for sewage analysis, including sewage sludge and muds, as proposed by a committee of the Federation of Sewage Works Associations and published in the *Sewage Works Journal* for May, 1935. These methods will be edited only sufficiently to conform to the rest of the text. They do not include any essentially new items—except that for chlorine demand—but represent, rather, modifications of present procedures. Where possible, references are made to other portions of the text rather than repeating complete procedures elsewhere described.

20. The inclusion in the section on sewage analysis of the complete procedures for the determinations for oxygen consumed and dissolved oxygen.

21. In the microscopic method, complete description of the use of the centrifuge for concentration is included. It is proposed to include in the Appendix of the volume a table with suggestions for the interpretation of results.

22. Dilution water for use in the bacteriological procedures may be either tap water or one of the dilution waters recommended in the test for biochemical oxygen demand.

23. In the bacteriological methods it is proposed to set up 3 tests for the detection of the coli-aerogenes group:

Presumptive Test
Confirmed Test
Completed Test

The presumptive and completed tests are essentially those in the present edition. In the confirmed test, it is proposed to allow the use of Endo or eosin-methylene blue agar plates or to confirm in one of four specified liquid media—confirmation to be complete when gas appears within 48 hours in the confirmatory medium inoculated from tubes showing gas as a result of primary planting in lactose broth. These media are:

Brilliant Green Bile
Crystal Violet Lactose Broth
Fuchsin Lactose Broth
Formate Ricinoleate Broth

24. Completed tests may be made either from lactose broth tubes showing gas or from tubes of a confirmatory medium showing gas.

25. Parallel planting in lactose broth and brilliant green bile for control in water purification plants be removed from the text and placed in an Appendix.

26. The formula for the preparation of Endo media has been revised in accordance with the work of Conn in coöperation with the members of the committee. The essential feature of this is a more definite statement in regard to the stock solution of fuchsin. The proposed strength is a 3 per cent solution. The present optional formula for Endo medium will be placed on a par with the first formula.

27. The method for calculating the coli-aerogenes group density, known as the Most Probable Number. The present method of calculating this index is retained as an alternative procedure for the use of single samples of water and will be known as the Indicated Number.

While the above constitute the definite fundamental changes recommended by the committee, it is desirable that the section be informed concerning certain proposed rearrangements of an editorial character. Some of these rearrangements have been mentioned above because of fundamental importance. Others include the division of Part I into two parts, the first to contain methods essential to or used in the sanitary examination of water, and the second part to contain the procedures dealing with mineral analyses. While it is recognized that such a division must be somewhat arbitrary because certain determinations might be included in either section, it is believed that this division will facilitate the use of the book. A new system of numbering the paragraphs will be used with the hope that cross-references will be less complicated than at present. This consists of a modification of a decimal numbering system. Certain of the procedures have been rewritten because of criticisms received from numerous sources. For example, the method for the determination of chlorine has been entirely revamped, as have the sections on turbidity, hardness, microscopic methods, and bacteriological procedures. In the latter, a new schematic arrangement to include the methods for the detection of the coli-aerogenes group has been devised and this will replace two of the present

sections which were found to be more or less cumbersome. The "outline of the daily routine" has been deleted. In connection with the newly recommended confirmatory liquid media, it has, of course, been necessary to include the method of preparation of these media. The present statement concerning variations in media when large samples of water are used for examination, has been clarified.

JOHN F. NORTON, *Chairman*
A. M. BUSWELL
F. E. DANIELS
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THEODORE A. OLSON
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WILLEM RUDOLFS

Diagnostic Procedures and Reagents

THE Section on Diagnostic Methods and Reagents of the Standard Methods Committee of the Laboratory Section has now been working for 2 years. Only one new referee, Dr. Henry P. Welch, referee for typhus fever, has been appointed since the last report. The referees and the subjects they are investigating are named in the *Year Book* for 1934–1935. In that report there also appear papers by several of the referees which are preliminary reports on the formulation of what has been called standard laboratory methods for the diagnosis of certain communicable diseases. In these reports it is clear that neither the committee nor any referee has approached the problem with the idea that methods will be devised which are final and unchangeable. It is well understood by the committee that anything which we report can be looked upon only as recommended methods and what we consider to be the best technic in view of our present knowledge to demonstrate characteristic biological features of certain microorganisms. Often during discussions of the desirability of the description of such methods objection is raised to the use of the phrase: "Standard Methods." The objection is always based upon the idea that there is implied by this phrase methods which are fixed and unchangeable, and that the Association is forever committed to them as the final opinion upon a completed subject.

Such controversies seem to show a complete failure to comprehend the purpose of recommending methods of procedure. It is, of course, apparent to all that the environment which we create for microörganisms determines what their reaction will be. Therefore any new knowledge concerning the influence of environment on their behavior may at once modify the technic used for the demonstration of their biological reactions. With an understanding of the shortcomings of our knowledge concerning the influence of environment upon the behavior of pathogenic microörganisms, and the behavior of these organisms to different environmental conditions, it is readily conceded that a final word on the methods to be employed in their study cannot now be said. But, on the other hand, the very uncertainty of our knowledge upon these questions makes more certain the importance of uniform methods of study. It needs no argument to show that if one laboratory attempts the isolation of *B. typhosus* from stools preserved in a special preservative, no comparison with the results of another laboratory which does not use such a preservative is possible. It is not alone for the purpose of comparison, however, that uniformity of method is desirable. Since the environment created by one laboratory is often so different from that of another, it is quite likely that one method gives better results than another or in certain instances a method may be entirely unsuited to the purpose for which it is used. A Standard Method, or recommended method, would give a uniformity growing out of a wide experience of many laboratories and out of the experience of large laboratories where time and money have made possible special investigation. Such methods, while not representing the ultimate of perfect knowledge, certainly do offer

an opportunity for the temporary or tentative standardization of methods.

In a discussion of the committee's conception of its task, there is another phase of laboratory work which should be mentioned, *i.e.*, the interpretation of laboratory results in terms of medical diagnosis. This phase of the work is influenced by so many factors which are not subject to methodology that no standard significance can be arbitrarily applied to any given laboratory results. Some of the factors which influence interpretations are the method by which the specimen is collected and how it is preserved, but at the juncture where the results of laboratory and clinical studies are put together is the point where standardization ends and where failure so often occurs. Failure results sometimes because the pathologist has not been supplied with sufficient clinical information upon which to base an interpretation of his finding. A contributing cause to such failure is due often to erroneous conceptions concerning the significance of laboratory findings. By some they are considered to be mathematically exact. No one knows better than the trained laboratory worker that such is not the case. There is no single laboratory determination which can be removed from the clinical environment which it was devised to elucidate, and its clinical significance evaluated. Thus the finding of morphological *B. diphtheriae* in a throat culture does not diagnose clinical diphtheria nor does a positive agglutination test diagnose typhoid fever, undulant fever, or other diseases, etc.

With all of these limitations in mind the Committee on Diagnostic Procedures and Reagents began its work of investigating the possibility of formulating methods which could more or less standardize certain phases of laboratory procedure. The first year was spent in selecting and appointing referees and in gathering data through questionnaires and by other means from laboratories throughout this country. The reports of these studies, those that have been completed, will be found in the *Year Book* and papers published in the *Journal* during 1935. The last year has been spent by the referees in the formulation of completed manuscripts describing methods of procedure for the recognition of infections with the various pathogenic microörganisms.

Because manuscripts from all of the referees have not been completed, and because those which are completed and ready for publication will undoubtedly be revised from time to time as information accumulates, it is recommended that the manuscripts which we now have be published in a loose leaf volume, and made available at a reasonable cost to laboratories wishing to use them. We now have 11 completed manuscripts, and there is another almost completed. The volume will therefore contain a description of methods used in the recognition of the following conditions and microörganisms.

1. Studies on the Toxicity of Brilliant Green for Certain Bacteria
2. Serological Tests for the Diagnosis of Syphilis
3. Serological, Bacteriological, and Other Biological Procedures in the Diagnosis of Undulant Fever
4. Recognition and Significance of Hemolytic Streptococci in Infectious Diseases
5. Serological and Bacteriological Procedures in the Diagnosis of Enteric Fevers
6. Whooping Cough and *B. pertussis*
7. Laboratory Diagnostic Procedures in the Recognition of Various Food Poisonings
8. Meningitis and Meningococcus
9. Gonorrhea and the Gonococcus
10. Amebiasis and *Ameba Histolytica*
11. Tuberculosis and the Tubercle Bacillus

Manuscripts which have been previously published in the *Year Book* but have been revised and manuscripts which have not been previously published are submitted with this report.

W. D. STOVALL, *Chairman*

Tentative Methods for the Diagnosis of Amebiasis and Amebic Dysentery*

I. Definition

"*Amebiasis* is the state of being infected with amebae. In practice it refers to *E. histolytica*." Dobell.

"*Amebiasis* is the invasion of the tissues of man by *E. histolytica*. The invasion is primarily through the mucous membrane of the large bowel—much more rarely through the mucous membrane of the ileum.

"*Amebic Dysentery* is a bloody mucoid diarrhea caused by *E. histolytica* and occurring as one of the manifestations of amebiasis." Craig.

II. Symptomatology

The symptoms vary from slight digestive disturbances to the most severe symptoms of amebic dysentery or amebic abscesses of the liver or other organs. In some individuals the symptoms are mild with few stools a day, while in others the symptoms are very severe—there is a sudden onset, with headache, severe colicky pain in the abdomen, malaise, tired, anxious, and drawn expression, tongue dry and furred, tenesmus and desire to defecate. There may be 6–30 bloody mucoid stools a day; emaciation, prostration and death from cardiac failure and exhaustion.

III. Etiology (*Endameba histolytica*)

Among the various amebae in man are:

* Report of the Referee on Amebiasis for the Standard Methods Committee on Diagnostic Procedures and Reagents.

Genus I. *Endameba* (Leidy, 1879)
Species in man—
E. histolytica, Schaudinn, 1903
E. coli, Grassi, 1879
E. gingivalis, Gros, 1849

Genus II. *Endolimax* (Kuenen and Schwellengrebel)
Species in man—
Endolimax nana, Wenyon and O'Connor, 1917

Genus III. *Iodameba* (Dobell, 1919)
Species in man—
Iodameba bütschlii

Genus IV. *Dientameba* (Jepps and Dobell, 1918)
Species in man—
Dientameba fragilis

IV. DIFFERENTIAL CHARACTERISTICS OF THE INTESTINAL AMEBAE OF MAN

The main criterion upon which the differences are based is largely the nuclear structure which involves the thickness of the nuclear membrane, size, type, and position of the karyosome, linin network (delicately stained fibrils in spaces between the karyosome and the nuclear wall), and chromatin granules. In addition to the nuclear structure, various other features are important—the number and type of nuclei, the type of chromatoid bodies, and the glycogen.

B. *E. Histolytica*

E. histolytica is divided into different races according to the size of cysts produced (Plates I and II).

Trophozoite—15–80 micron.

E. histolytica which produce small variety cysts are usually smaller and not quite as rapidly motile as those producing large variety cysts. In the cases which we have had we have never been able to find red blood cells in the trophozoites which gave rise to small variety cysts. Bloody mucous stools from acute cases of amebic dysentery usually show quite large *E. histolytica* trophozoites; whereas the trophozoites found in soft stools from mild cases of amebic dysentery are usually smaller in size approaching in size those which give rise to small variety *E. histolytica* cysts.

Cytologically the trophozoites have clear, glass-like ectoplasm and finely granular endoplasm. The motility is usually in a straight line by means of a single large blade-like pseudopodium which moves rapidly and explosively. Usually the nucleus flows into the pseudopodium first, the red blood cells and the finely granular material follow the nucleus into the pseudopodium. In fresh, bloody mucous stools (from acute cases of amebic dysentery) the motility is very rapid. In old stools the motility is more sluggish and the pseudopodia are blunt blade-like.

Precysts—Before encystment the organism becomes round or slightly oval, hyaline (by ridding itself of ingested material), smaller in size, and loses motility completely or it may continue to send out very small blunt pseudopodia. The nucleus consists of a ring of small refractile granules. The precyst secretes a delicate wall and encysts.

Cystic stage—Size 5–20 μ (small variety, 5–12 μ; large variety, 12–20 μ)—The cysts contain 1–4 nuclei, although as many as 8 have been described. The nuclei have characteristic structures—thin nuclear membrane composed of fine granules of chromatin and a very small centrally placed karyosome.

Young cysts have typical chromatoid bodies—rods with blunt ends. These show up best in moist preparations. In iodine stained preparations, brown staining glycogen may be seen. Both the chromatoid bodies and the glycogen disappear when the cysts are old.

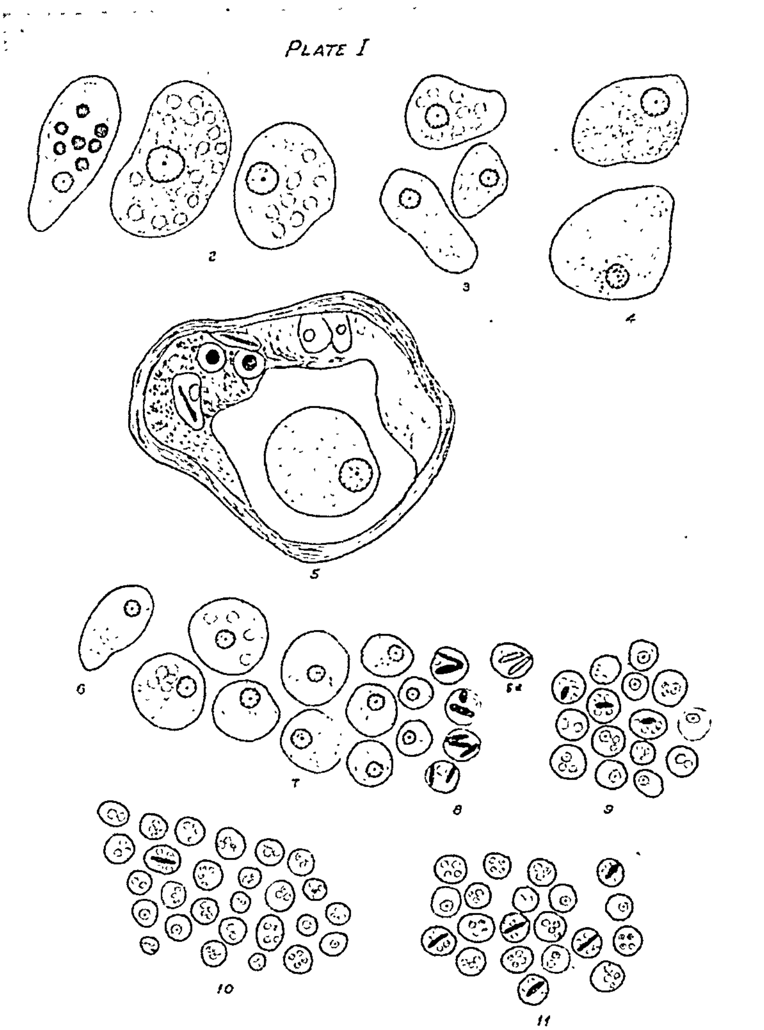

PLATE I, Figures 1–11—*E. histolytica* (Large variety, except for few small cysts, Fig. 10)

Fig. 1. Trophozoite, showing the nucleus and red blood cells (from a bloody mucous stool of an active case, M.) (Red blood cells, chromatin granules and karyosome filled in with India ink to show up better)

Fig. 2. Trophozoites from an iron-hematoxylin preparation

Fig. 3. Trophozoites from a section of an amebic ulcer of the large bowel (iron-hematoxylin stain)

Fig. 4. Trophozoites from a section of a liver abscess (iron-hematoxylin stain)

Fig. 5. A trophozoite in a capillary of the large bowel (from the same section as Fig. 3)

Fig. 6. Trophozoite passing into the precystic stage (water preparation)

Fig. 7. Precysts of various sizes (water preparation)

Fig. 8. Young cysts (water preparation) showing typical chromatoid bodies and nuclei. (Figs. 6, 7, and 8 are from case M. M.)

Fig. 8a. Chromatoid bodies and nucleus as seen in water preparation.

Fig. 9. *E. histolytica* cysts, large variety (iodine preparation) showing nuclei with karyosomes, chromatoid bodies and glycogen (same case as Figs. 6, 7 and 8)

Fig. 10. Large, intermediate, and small *E. histolytica* cysts, case C. N. (iodine preparation)

Fig. 11. *E. histolytica* cysts—large variety, case R (iodine preparation)

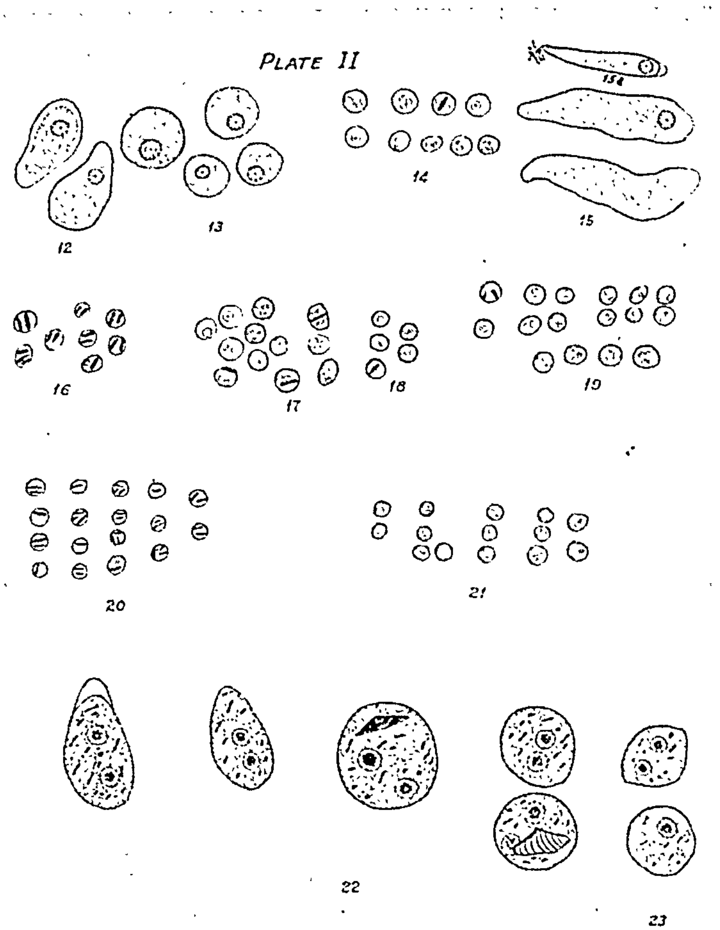

PLATE II, Figures 12–21—*E. histolytica*, small variety

Fig. 12. Trophozoites showing nucleus (water preparation)

Fig. 13. Precysts (water preparation)

Fig. 14. Cysts (iodine preparation)

Fig. 15. Trophozoites from a 24 hr. culture (case H. Sch. same as Figs. 12, 13 and 14)

Fig. 15a. Trophozoite from a 24 hr. culture from Case R.

Fig. 16. Small and intermediate cysts (water preparation) showing chromatoid bodies and nuclei (case J. R. G.)

Fig. 17. Intermediate sized *E. histolytica* cysts (iodine preparation) same as case in Fig. 16)

Fig. 18. Small *E. histolytica* cysts (iodine preparation) same case as 16 and 17

Fig. 19. Small *E. histolytica* cysts (iodine preparation) from case Wm. L. J.

Fig. 20. Small *E. histolytica* cysts (water preparation) from same case as Fig. 19

Fig. 21. Very small cysts of *E. histolytica* (iodine preparation) same case as Figs. 19 and 20)

Figs. 22 and 23—Dientameba fragilis:

Fig. 22. Trophozoites (saline preparation) from case K.

Fig. 23. Trophozoites from iron hematoxylin preparations brought from Hamburg

NOTES EXPLAINING THE DRAWINGS

Most of the drawings were made from moist preparations (saline, water, and iodine) of fresh material, with a camera lucida, using a number 10 eye piece and a high, dry, $\frac{1}{6}''$ objective. (Bacteria, crystals, yeast cells, starch grains, red blood cells, karyosomes, chromatoid bodies, and chromatin granules have been filled in with India ink in order that they may show up better.) The oil immersion lens was used in making drawings from sections of tissue and from iron-hematoxylin preparations.

C. *E. Coli* (Plate III, Figs. 24–30)

Trophozoite—The trophozoites vary in size from 15–50 μ, the average size being about 20–25 μ. As a rule there is no differentiation between the ectoplasm and the endoplasm. There are many food vacuoles containing ingested material — bacteria, crystals, starch grains, pus cells, yeast cells, flagellates, and *E. histolytica* cysts. The organism moves sluggishly in one direction for a short distance, halts, produces a pseudopodium from another portion of the body, and moves in another direction, chiefly by changing its shape. Occasionally one encounters very motile *E. coli* which may be confused with *E. histolytica*. In such an event careful examination will reveal ingested debris, bacteria, etc., which does not usually happen with *E. histolytica*. In case of doubt, stained preparations should be made, using the iron-hematoxylin method and the nuclei should be studied carefully. Repeated direct stool examinations should be made, as well as cultures.

Cytologically, the organism contains a visible nucleus surrounded by a thick membrane composed of coarse chromatin granules. The karyosome is fairly large and usually to one side of the center. Chromatin granules are present in the clear zone between the karyosome and the nuclear membrane.

Precystic stage—15–30 μ—In this stage it is frequently difficult to differentiate *E. histolytica* from *E. coli*. As a rule, however, *E. coli* has a thicker wall, the cytoplasm is more granular, and the chromatin granules are coarser.

Cystic stage—10–30 μ (average size 14–20 μ)—The cysts of *E. coli* have fairly thick walls. There are 1–8 nuclei (16–32 have been described). We have seen 12–16 nuclear cysts. The karyosome is usually large and eccentric. The chromatoid bodies are needle- or splinter-like, with sharply pointed ends. Glycogen is present in young cysts. In the single nuclear stage the nucleus is large, becoming progressively smaller with the increase in the number of nuclei.

D. *Endolimax nana* Wenyon and O'Connor, 1917 (1918) (Plate III, Figs. 36 and 37)

Trophozoite — 8–15 μ — The cytoplasm is granular, containing food vacuoles filled with bacteria, yeasts and debris. The motility is by means of short, blunt, hyaline pseudopodia, which are thrown out and withdrawn slowly. In fresh material or in cultures the motility may be by means of slender, finger-like pseudopodia. The nucleus has an indistinct wall without chromatin granules. The karyosome is large and irregular.

Precystic stage—In unstained preparations it is refractile, round, or oval. The cytoplasm is free from vacuoles, bacteria, and debris.

Cystic stage—5–12 μ—In unstained preparations the cysts appear as refractile, colorless, round or oval bodies containing 1–4 nuclei. In stained preparations the characteristics stand out plainly—there are 1–4 nuclei with faint nuclear membranes and no chromatin granules. There is a large central or eccentric karyosome in each nucleus. Glycogen is rarely seen.

E. *Iodameba bütschlii* von Prowazek, 1912; Dobell, 1919 (Plate III, Figs. 31–35)

Trophozoite—5–20 μ or larger (average 10–15 μ)—It is a small ameba moving sluggishly, as a rule, by means of broad, round, and hyaline pseudopodia. In living trophozoites the nucleus is frequently invisible. In well stained preparations, however, the small nucleus (2–3.5 μ) with its large central karyosome, shows up well. The nuclear membrane is usually achromatic. Between the karyosome and the nuclear membrane is a zone filled with gran-

IMPORTANT CRITERIA IN DIFFERENTIATING INTESTINAL AMEBAE

	E. histolytica	*E. coli*	*Endolimax nana*	*Iodameba bütschlii*	*Dientameba fragilis*
Trophozoite Size	18–60 μ 20–35 μ aver.	20–30 μ 15–20 average	6–12 μ 8 average	5–20 μ 10–15 average	10–50 μ
Motility	Active - progressive directional	Sluggish, progressive, not directional	Sluggish, progressive	Sluggish	Active, progressive
Pseudopodia	Finger - shaped, clear, glass-like	Shorter, more blunt, less glass-like	Broad, blunt, not glasslike	Broad, rounded, hyaline	Flat, leaf-like, hyaline
Inclusions	Red blood cells when stools contain blood. No bacteria in fresh stools	No red blood cells. Bacteria, yeasts, crystals, cysts, etc.	No red blood cells, bacteria, debris, etc.	Bacteria, debris, etc.	Bacteria, crystals, debris, etc.
Nucleus	May be invisible	Visible	Visible	Freq. invisible in unstained preparations	Usually visible
Nuclear membrane	Delicate, with single layer of minute chromatin granules in inner surface	Thicker, inner surface lined with coarser chromatin granules	Thin, chromatin rarely seen in inner surface	Thin, but thicker than in *E. histolytica*	Thin, delicate and free from chromatin except in degenerating forms
Karyosome Size	Very small; usually in center of nucleus	Larger, usually eccentric	Large, and may be divided into 1 large and 1 small	Large and central	Large, usually composed of 4 or more deeply staining granules
Intranuclear chromatin	No chromatin between karyosome and membrane	Chromatin granules between karyosome and membrane	Mass situated at one side or in center of nucleus	Frequently small granules of chromatin on inner side of membrane. Linin network between karyosome and membrane	
Cystic Stage Size	5–20 μ	10–20 μ	5–10 μ	5–20 μ	
Shape	Mostly spherical, may be oval or irregular	Spherical, oval or irregular	Spherical, oval or ellipsoidal	Round, oval, rhomboidal, triangular, fusiform	
Nuclei	1–4	1–8	1–4	1, rarely 2	
Karyosome	Minute, central	Larger, eccentric	Large, central or to one side	Large, eccentric, in contact with membrane (signet ring)	
Nuclear Membrane	Delicate	Thicker	Delicate	Thin	
Chromatoid bodies	Bar, oval or rod-like with blunt ends. Present in about 50% of cysts	Splinter- or needle-like; pointed ends. Present in about 10% of cysts	None	None. "Iodophilic" glycogen mass	

ules. When the preparation is well stained the linin network (between the karyosome and the nuclear membrane) shows up. The cytoplasm is homogeneous and finely granular, containing food vacuoles filled with bacteria, crystals and various debris. The glycogen mass is usually large, and stains dark brown with iodine. In iron hematoxylin preparation the glycogen vacuole can be seen.

Precystic stage—In this stage the organism is free from food vacuoles; it appears clear, glassy white and contains a large nucleus. It rounds up, secretes a cyst wall and encysts.

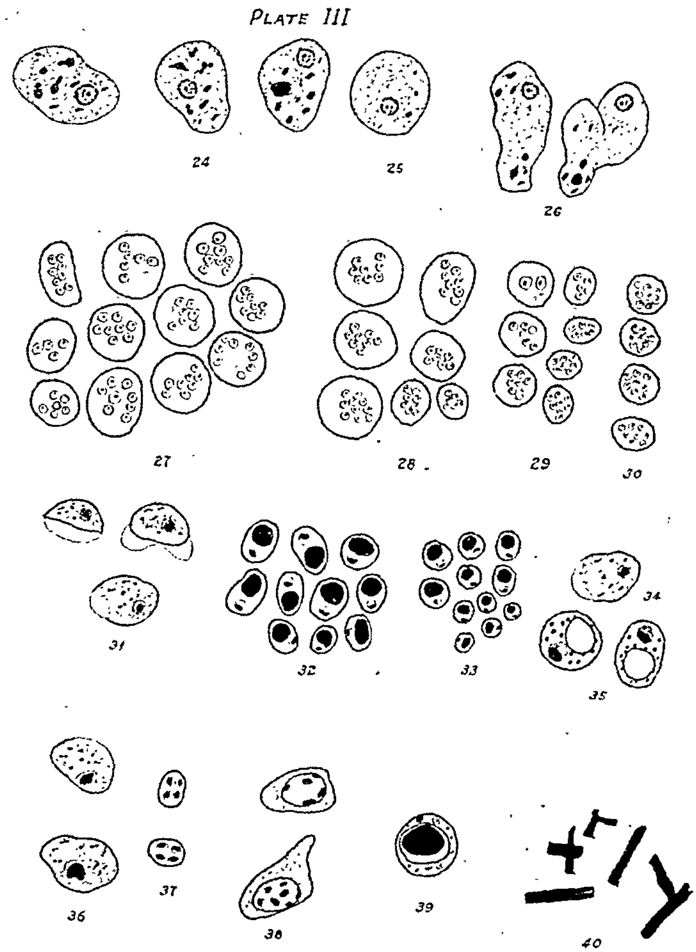

PLATE III, Figures 24–30—*Endameba coli*

Fig. 24. Trophozoites (water preparation) from case E. L.

Fig. 25. Precysts from the same case (water preparation)

Fig. 26. Very motile trophozoites from the same case (water preparation)

Fig. 27. Quite large *E. coli* cysts (iodine preparation) from case Sp.

Fig. 28. *E. coli* cysts of various sizes (iodine preparation) 1 shows 10 nuclei—Case Chas. S.

Fig. 29. *E. coli* cysts (iodine preparation) showing various sizes and various stages of the division of the nuclei

Fig. 30. *E. coli* cysts (iodine preparation) quite uniform in size, from case J. N.

Figs. 31–35—Iodameba bütschlii:

Fig. 31. Trophozoites (water preparation) from case E. L.

Fig. 32. Cysts (iodine preparation) from case J. R. G.

Fig. 33. Cysts (iodine preparation) from case E. C.

Fig. 34. Trophozoite from iron-hematoxylin preparation

Fig. 35. Cysts from iron-hematoxylin preparation, showing the typical nucleus, glycogen vacuole and volutin granules

Figs. 36–37—Endolimax nana:

Fig. 36. Trophozoite, iron-hematoxylin stain

Fig. 37. Cysts, iron-hematoxylin stain

Fig. 38. Macrophages from a section of an amebic ulcer of the bowel

Fig. 39. Blastocystis hominis (iron-hematoxylin preparation)

Fig. 40. Bismuth crystals (water preparation)

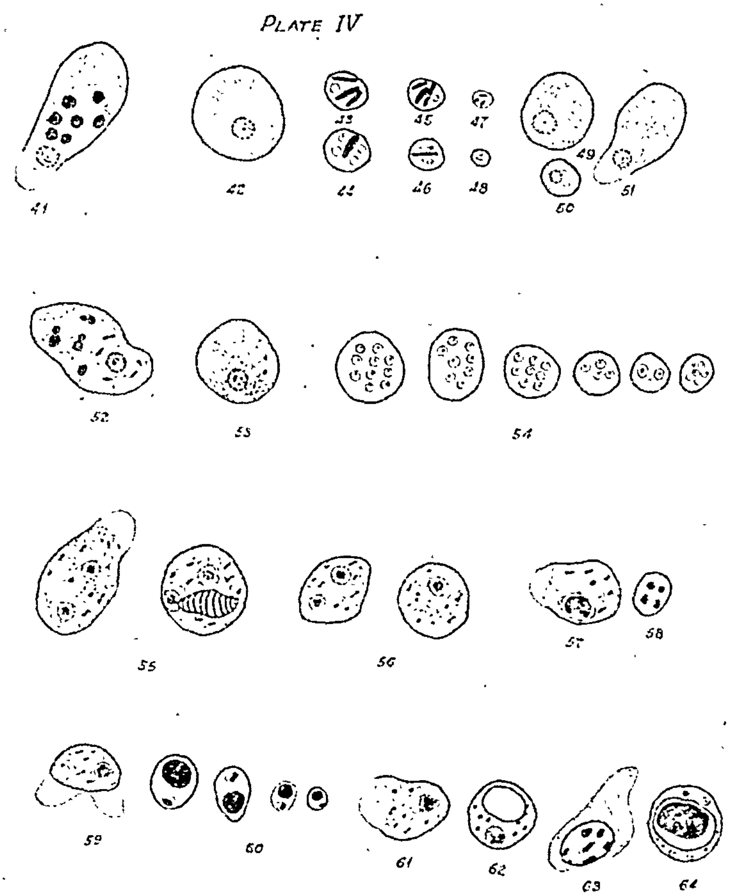

PLATE IV—Summary Plate

Fig. 41. *E. histolytica* trophozoite from a bloody mucous stool
Fig. 42. *E. histolytica* precyst (water preparation)
Fig. 43. *E. histolytica* cyst, large variety (water preparation)
Fig. 44. *E. histolytica* cyst, large variety (iodine preparation)
Fig. 45. *E. histolytica* cyst, intermediate size (water preparation)
Fig. 46. *E. histolytica* cyst, intermediate size (iodine preparation)
Fig. 47. *E. histolytica* cyst, small variety (water preparation)
Fig. 48. *E. histolytica* cyst, small variety (iodine preparation)
Figs. 49, 50 and 51. Large precyst, small precyst, and trophozoite from a specimen showing small variety *E. histolytica* cysts

Figs. 52–54—E. coli:
Fig. 52. Trophozoite (water preparation)
Fig 53. Precyst (water preparation)
Fig. 54. Cysts of various sizes and number of nuclei (iodine preparation)

Figs. 55 and 56—Dientameba fragilis:
Fig. 55. Trophozoite from saline preparation
Fig. 56. Trophozoite from iron-hematoxylin stain

Figs. 57 and 58—Endolimax nana
Fig. 57. Trophozoite (iron-hematoxylin stain)
Fig. 58. Cysts (iron-hematoxylin stain)

Figs. 59–62—Iodameba bütschlii:
Fig. 59. Trophozoite (water preparation) showing pseudopodia
Fig. 60. Cysts (iodine preparation)
Fig. 61. Trophozoite (iron-hematoxylin stain)
Fig. 62. Cysts (iron-hematoxylin stain) showing nucleus, glycogen, vacuole and volutin granules

Fig. 63. Macrophage from a section of an amebic ulcer of the bowel
Fig. 64. Blastocystis hominis. (It is a vegetable organism, a non-pathogenic fungus, about 5–40μ in diameter. It may be oval or spherical with a narrow band of cytoplasm containing refractile granules and one or more round or oval nuclei surrounded by a delicate membrane. Dividing forms, seen so frequently in cultures, have an hour glass appearance due to the constriction near the center of the cell.)

In hematoxylin stained preparations the narrow band of peripheral cytoplasm is unstained and contains well stained nuclei with large deeply staining karyosomes.

Cystic stage—6–20 μ (average, 9–12 μ)—There is a great variation in shape of the cysts; round, oval rhomboidal, etc. There are one or more glycogen masses staining from pale to mahogany brown with iodine. Other inclusions appear giving staining reactions of volutin. Usually there is only one nucleus, rarely two. The nucleus differs in that the granules are massed at one pole and the karyosome is pressed toward the wall, producing a "signet ring" appearance.

F. Dientameba fragilis Jepps and Dobell, 1918 (Plate II, Figs. 22 and 23)

Trophozoite—Usually described as being small, about 12 μ, but they may be quite large, as large as *E. histolytica*. The organism moves rapidly by means of flattened, leaflike, hyaline pseudopodia. There is differentiation between ecto- and endoplasm. The cytoplasm may be finely or coarsely granular, containing food vacuoles filled with bacteria, yeast cells, starch grains, etc. The most important diagnostic feature is the presence of two nuclei. On dividing, the organism results in two uninucleate individuals, the nuclei of which divide, resulting in binucleate organisms. The nuclei are bounded by fine membranes. The karyosome is usually in the center, but may be at one side of the nucleus. The karyosome is composed of granules, usually only four large, deeply stained, chromatin granules.

V. DIAGNOSTIC PROCEDURE

All stools should be collected in clean, dry containers, free from disinfectants. Oil, bismuth, barium, and medications render the stools undesirable. All stools should be examined as fresh as possible. Soft and bloody mucous stools should be examined immediately or as soon as possible and should never be left over night.

No person should be pronounced negative until 6 stools have been examined on different days. Some of these stools should be obtained normally, and others following the administration of salts. In choosing material for examination, any part of the homogeneous stool and every part of the heterogeneous stool should be examined.

The macroscopic appearance of the stool is significant—whether it is hard, soft, liquid, and whether it contains blood, pus, and cellular exudate. A soft stool, intimately mixed with blood and mucus, containing pus and cellular exudate, is much more indicative of bacillary than of amebic dysentery (F. W. O'Connor), whereas bloody, mucous stools are highly suspicious for amebic dysentery.

Balantidial dysentery due to *Balantidium coli*, a ciliate, is indistinguishable clinically from amebic dysentery. The differential diagnosis must be made by finding the etiological organism.

In alcoholic diarrhea the stools simulate those in amebic dysentery in appearance, but persistent examinations of the stools fail to reveal *E. histolytica* and the patient gets well after several days' rest in bed.

In syphilitic ulcerations of the rectum, the stools may be diarrheal or semi-solid, containing mucus and shreds of tissue. The positive Wassermann test is of diagnostic importance here.

Tuberculous ulceration of the bowel, a common complication of pulmonary tuberculosis, is associated with frequent stools containing mucus and small amounts of blood, except shortly before death, when massive hemorrhages may occur. Finding tubercle bacilli in the stools is of no great importance because a patient with pulmonary tuberculosis may swallow some tubercle bacilli in the sputum.

In chronic mucous colitis there are mucous casts and no blood in the stools. Nonspecific ulcerative colitis, on the

other hand, is associated with frequent stools containing pus, blood, and small amounts of cellular exudate.

In malignant diseases of the bowel the stools are frequent and contain much pus and blood (frequently chocolate in color). The differential diagnosis is based on the laboratory findings, proctoscopic examination, and X-ray findings.

However, whatever the appearance of the stool, a careful examination of at least 4–6 smears should be made before pronouncing it negative. If anything suspicious is seen, a very careful examination should be made, making as many smears as may be necessary. If no decision can be reached, repeated stool examinations should be made by direct examination, by culture, and iron-hematoxylin preparations if necessary.

VI. MICROSCOPIC EXAMINATION

Things necessary for efficient work:

A good microscope

Objectives: Low—2/3″; High dry—1/6″; Oil immersion—1/12″

Oculars—10 is indispensable (4 or 6 may also be of need)

Ocular micrometer—properly calibrated

Good light; artificial is best because it is always the same.

EXAMINATION

Bloody mucous stools from active cases of amebic dysentery—Specimens may be obtained with the proctoscope on proctoscopic examination, by means of a rectal tube, by inserting a glycerin suppository, or normally. A tiny granule of bloody mucus is chosen, placed on a slide, covered with a cover slip and examined under low power first and then under high dry for active *E. histolytica* with red blood cells in them. If the stool should contain fecal material it should be diluted first with a little warm saline to the proper consistency. This is done by placing a drop of warm saline on a slide, a little of the stool is taken on an applicator or needle and emulsified (mixed well) to reading opacity in the drop of saline, covered with a cover slip, and examined as above. The diaphragm of the microscope should be closed as much as possible.

VII. EXAMINATION OF STOOLS FROM CONVALESCENT CASES AND CARRIERS

As the diarrhea of the active cases of amebic dysentery subsides following medication, the feces remains longer in the large bowel, the active amebae lose their motility and begin to round off, giving rise to precysts. The precysts of *E. histolytica* are 20–30 μ in diameter, hyaline in appearance, and are free from granular material, or contain only very fine granular material (the remains of the red blood cells). The nucleus is typical, containing a small central karyosome, and is bounded by a fine membrane composed of fine chromatin granules. In this stage it is sometimes difficult to diagnose *E. histolytica*. Such stools may be cultured (on liver infusion, agar overlaid with serum, saline, described later), whereupon the precysts vegetate, giving rise to typical *E. histolytica* trophozoites. If difficulty is still encountered, the examinations should be repeated on normal stools as well as those following salts. Iron-hematoxylin preparations might also be made and examined for typical *E. histolytica* with the oil immersion lens.

As the stools remain longer in the large bowel they become more formed and the amebae encyst, giving rise to cysts containing 1–4 nuclei.

Formed stools from convalescent cases or from carriers should be examined with warm water or saline as well as with iodine. (The iodine solution should be fresh—a 1 per cent aqueous solution of iodine in 2 per

cent potassium iodide, or an aqueous solution of 5 per cent potassium iodide saturated with iodine and diluted with an equal part of distilled water for use. This should be kept in a brown bottle and away from the light, or a card may be wrapped around the bottle to keep the iodine solution from disintegrating.)

In making smears a drop of saline or water is placed on a slide. In this is emulsified a small amount of feces, with a needle or applicator, to reading opacity, covered with a cover slip, and examined first with the low power and then with the high dry (some people prefer to use the oil immersion lens). In such smears may be seen flagellates, amebae, ova, larvae of such worms as *Strongyloides*, etc. In young cysts the chromatoid bodies show up very clearly in the water or saline preparations. Several smears of each specimen should be examined with saline or water, as well as with iodine. In the iodine preparations iodine instead of water or saline is used and smears made and examined exactly the same as above. The iodine kills the protoplasm and stains the cytoplasm more or less yellow, the cyst and nuclear walls dark, and the glycogen dark brown. As a rule, the karyosomes stand out as refractile bodies. Thus one can study the number and type of nuclei, thickness of the cyst wall, type and position of the karyosome, etc. Iron-hematoxylin permanent preparations are unnecessary unless finer details are desired to study.

VIII. Examination of Pus from Liver and Lung Abscesses

In examining pus from liver and lung abscesses one should look for active *E. histolytica*, for they do not encyst in pus. *E. histolytica* are found in the walls of abscesses and not in the central necrotic material, so that care should be taken to procure material from the walls of such abscesses in examining for *E. histolytica*.

In case of doubt as to the diagnosis of an intestinal protozoan, or if permanent preparations are desired for other reasons, the following method has been found to work the best: The material should be perfectly fresh, properly fixed, and at no time in the process should the slide or cover slip preparations be permitted to dry; as soon as that happens the preparations are ruined and should be discarded. Bloody mucous or soft stools need not be diluted, but hard stools should be diluted with saline before making smears. Smears may be made on slides or cover slips, using an applicator. Smears should be uniform and not too thick. If slides are used, the fixing fluid should be placed in staining jars. If cover slips are used, the fixing fluid is placed in Petri or evaporating dishes. Smears of the proper thickness are made and the cover slips are immediately dropped film side downward into the fixing fluid and are permitted to float for a few moments, then they are picked up with forceps and completely immersed face upward, using plenty of fixative and discarding it when through.

Procedure for Fixing and Staining (Iron-hematoxylin Method)

Fixing solution—Schaudinn's solution

Saturated solution of mercuric chloride in distilled water.. 2 parts
95% alcohol . . . . 1 part

To every 100 c.c. of this mixture add 2–5 c.c. glacial acetic acid

Fix 10–20 minutes (30 minutes is better for cysts)

Wash and harden

50% alcohol for a few minutes

To remove fixation, 70% alcohol to which a few drops of iodine solution (alcoholic) has been added, for at least 10 minutes. The iodine removes the remaining $HgCl_2$.

95% alcohol (best for an hour or several days)

Hydrate

70% alcohol for a few minutes

50% alcohol for a few minutes
30% alcohol for a few minutes
Distilled water

Stain (Iron-hematoxylin method)

Mordant by placing in 2% aqueous iron alum (ammonium ferric sulphate) 2–6 hours
Wash in distilled water for a few seconds
Stain in 0.5% ripened solution of hematoxylin in distilled water 6–24 hours. (Make up solution, place in flask, plug with cotton wool, place in a warm place —in the sun, if possible—shaking from time to time. When the solution is "ripe"—a good brown color, namely the hematoxylin is more or less oxidized to hematein, it is ready for use. This may require several weeks.)
Wash in distilled water
Differentiate in 0.5 to 1% aqueous iron alum (never permitting the preparation to dry during the process). Remove a slide, rinse in distilled water, and examine under the microscope for proper differentiation; the cytoplasm should be gray; the cyst, nuclear walls, as well as the chromatoid bodies and karyosomes, should be black when properly decolorized.
Wash in distilled water
Then in running tap water for at least ½ hour in order to wash out all the alum; otherwise the decolorization will continue
Wash in distilled water

Dehydrate

50% alcohol 5 minutes
70% alcohol 5 minutes
95% alcohol 5 minutes
Absolute alcohol 10 minutes, 2 changes
(Absolute alcohol and xylol, 50–50, 5 to 10 minutes)

Clear (Xylol 5 minutes)
Mount in balsam.

IX. CONCENTRATING STOOLS FOR CYSTS

A number of methods may be used in concentrating specimens for cysts when these are present in small numbers. One method is to take a small piece of the stool, emulsify it well in water or saline, strain through two layers of gauze, centrifuge at moderate speed 2 or 3 minutes, pour off the supernatant fluid, emulsify the sediment as before, and repeat the washing 2 or 3 times. Examine the final sediment with water and iodine.

Another method is to emulsify a small piece of feces with distilled water, place it in a 500 c.c. graduate, make up to 500 c.c. with distilled water, mixing well. Let it stand for 20 to 30 minutes, pour off the supernatant fluid and replace with distilled water, mix well and let stand over night. Then examine the sediment with water and iodine solution.

X. CULTURAL METHODS

At times cultures are of great assistance in making a diagnosis because precysts, cysts, and atypical trophozoites become typical trophozoites showing the characteristic morphology and motility. However, the cultures must be made properly and carefully, using proper media, aseptic methods, and examining at the proper time. Cultures should not be relied upon entirely because our experience during the Chicago epidemic has taught us that only about 5–8 per cent of the small variety *E. histolytica* grow in the culture medium used for the large variety. The presence of arsenic and other amebicides prevent *E. histolytica* from growing. Routine cultures are unnecessary in making a survey.

MEDIA

Cleveland and Collier (*Liver infusion agar*)

This medium is one of the best for practical diagnostic purposes. The medium consists of slants of liver infusion agar.

30 gm. liver infusion agar (Digestive Ferments Co., Detroit, Mich.)
3 gm. dehydrated sodium phosphate
1,000 c.c. distilled water
Dissolve, tube about 5 c.c. per tube, sterilize 15 lb. for 30 minutes, slant and keep in the ice box until shortly before using.

Before making inoculations these slants are overlaid with sterile serum saline 1–6. (Wassermann negative hu-

man inactivated serum, horse or rabbit serum, etc., may be used by taking 1 part of serum to 6 parts of NaCl, filtering through a sterile Berkefeld filter, incubating 24–48 hours to test sterility. If sterile, place in the ice box until shortly before using.)

The slants and serum saline should be placed in the incubator for a couple of hours before using in order to bring the temperature up to body temperature. Sterile precautions should always be used in making the cultures. Before making inoculations the slants are overlaid (sterilly) with sterile serum NaCl, 1–6. A little sterile rice starch or rice flour may be added, but is not necessary. If the stool is soft, watery, or bloody mucus, a little is inoculated, using a sterile pipette or needle. If the stool is solid, a loopful is inoculated, macerating well by rubbing with the needle against the sides of the tube. Incubate at 37.5° C., and examine after 24 and 48 hours. Cultures should not be examined prematurely because occasionally *E. coli* grows in this medium, and in young cultures when rapid division takes place the nuclear structure may not be typical, the motility rapid; so that one may have difficulty in differentiating *E. histolytica* from *E. coli*. Occasionally sub-cultures are necessary in order to decide as to whether an organism is *E. histolytica* or *E. coli*. In 24–48 hour cultures, even when *E. coli* is present, it shows its typical characteristics—thick wall, sluggish motility, the entire organism seems to roll about in its wall. *E. histolytica*, on the other hand, has a thin wall and moves rapidly by means of a pseudopodium in an elongating, slug-like manner.

"Mature living *E. histolytica* cysts do not all hatch simultaneously nor at the same rate; some hatch quickly, others slowly. They usually begin to hatch after 2¼ hours' incubation. Cysts which do not hatch after 12 hours' incubation usually perish. Occasionally some hatch after 20 hours' incubation. Cysts begin to hatch when the chromatoid bodies and glycogen disappear." C. Dobell, *Parasit.* XX, 4:383, 1928.

All other intestinal amebae do not grow as readily in this culture medium and cannot be maintained in culture as long as *E. histolytica*. When the other intestinal amebae grow in this culture medium they show their typical characteristics and should not be confused with *E. histolytica*.

In order to keep strains of *E. histolytica* going, make sub-cultures every 48 hours (using sterile precautions). A little sterile rice flour or rice starch is added to the liver infusion agar slant overlaid with serum saline before making the inoculations. To make the sub-cultures, use a sterile pipette with a good sized bore and transfer a little of the sediment, taking as little of the supernatant fluid as possible. Some strains of *E. histolytica* grow readily, while others grow with great difficulty.

Locke Serum Medium of Craig

This medium consists of a mixture of a modified Locke solution and inactivated human, horse or rabbit serum. The serum used should not be over 48 hours old.

Locke solution:

Sodium chloride	9.0	gm.
Calcium chloride	0.024	gm.
Potassium chloride . .	0.42	gm.
Sodium bicarbonate. .	0.20	gm.
Distilled water	1,000	c.c.

Filter and autoclave 15 lb. 15 minutes

Medium:

1 part inactivated (56° C. ½ hour) serum to 7 parts Locke solution
Filter through a Berkefeld filter
Tube 10 c.c. per sterile tube
Incubate 24–36 hours to test sterility
Keep in incubator until used.

A slight amount of sterile rice starch or rice flour increases the efficiency of this medium.

XI. COMPLEMENT-FIXATION IN THE DIAGNOSIS OF AMEBIASIS AND AMEBIC DYSENTERY

The technic is practically the same as that used in the standard method for the complement-fixation of syphilis in the United States Army laboratory fully described in Craig's "The Wassermann Test" (1920), except that the specific amebic antigen is used. The anti-human as well as the anti-sheep system may be used.

Reagents needed:

The blood serum to be tested is inactivated in a water-bath at 56° C. for ½ hour.

Antigen—alcoholic extract of sediment of cultures of *E. histolytica*.

Antigen Control—prepared exactly the same way as the test antigen except that the bacteria growing in association with the *E. histolytica* are used.

Amboceptor—anti-human or anti-sheep, as the case may be.

Complement Guinea Pig Serum:

Red blood cells—type 4 (Moss) human or sheep cells (whatever system is used).

Set up of test:

Front and rear tubes

Place 0.9 c.c. NaCl in each tube

Test 0.1 c.c. unknown serum in front and rear tubes

0.1 c.c. + serum in front and rear tubes

0.1 c.c. — serum in front and rear tubes

1 unit antigen to front tubes

2 units complement to each tube

Incubate—water-bath 37.5° C. ½ hour

Add 0.5 c.c. 3% cells (Craig uses 0.1 c.c. of 5%)

Add 2 units amboceptor

Incubate 37.5° C. water-bath for 1 hour

Shake every 15 minutes

Place in ice box for 2 hours and read. Readings are made as follows: 4+, 3+, 2+, + and ±, according to the degree of inhibition of hemolysis.

Any reaction below 3+ should not be considered diagnostic unless the patient has been treated. Upon treatment the complement-fixation becomes negative.

The complement-fixation test is still in the experimental stage and one may use the test only as an aid and not as an absolute criterion in making a diagnosis. As little as one injection of emetine hydrochloride will change a positive complement-fixation reaction to negative when the stools may still show motile amebae.

BERTHA KAPLAN SPECTOR,
Referee

Tentative Methods for the Serological and Bacteriological Procedures in the Diagnosis of Enteric Fevers*

The report submitted to your committee in 1934 outlined the fundamental procedures recommended as aids in the diagnosis of enteric disease. These were based upon reports in the literature, information obtained by means of questionnaires sent to directors of laboratories representative of various sections in the United States and Canada, and personal experience. The outline was published in the *Year Book* of the Association in the hope that persons other than those who had received the questionnaire would submit comments and criticisms. While the response has been limited, the data now available would seem sufficient to warrant the inclusion of details of technic in the outline previously prepared.

Appended to the 1934 report was a list of problems which seem particularly vital to the development of the most efficient and reliable methods employed as aids in the diagnosis of enteric disease. Considerable interest has been shown by certain investigators, and in some instances contributions have been made. However, as would be expected, there was lack of uniformity in the studies undertaken by the various workers and in the type of data furnished. It is suggested, therefore, that a selected group of laboratories be invited to participate in a coöperative investigation of at least certain of the problems, in which a carefully planned mode of procedure would be followed.

The problems previously suggested for coöperative study are listed for reference.

PROBLEMS FOR COÖPERATIVE STUDY

SEROLOGICAL PROCEDURES

I. Comparison of various types of suspension for demonstrating the granular type of agglutination with *B. typhosus*.

II. Study of the diagnostic significance of macroscopic agglutination tests with suspensions of: (1) *B. paratyphosus* A, (2) *B. paratyphosus* B, (3) *B. dysenteriae*, and (4) other mem-

* Report of the Referee on Methods and Reagents for the Diagnosis of Enteric Fever for the Standard Methods Committee on Diagnostic Procedures and Reagents.

bers of the enteric disease group in patients' sera.

III. Selection of standard strains for the tests mentioned in I and II.

IV. Study of other serological tests, for example, complement-fixation and precipitation tests, in the diagnosis of enteric disease.

BACTERIOLOGICAL PROCEDURES

I. Selection of the optimum preservative for fecal and urinary specimens when the bacteriological examination for microörganisms of enteric disease cannot be undertaken immediately after collection.

II. Determination of the etiological significance of species concerning which there is, at present, difference of opinion, for example, *B. morgani* No. 1, *B. alkalescens, B. dispar*, etc.

III. Establishment of criteria for the most rapid and accurate identification of species, particularly those belonging to the dysentery and paratyphoid-enteritidis group.

SEROLOGICAL PROCEDURES

EXAMINATION OF SERUM FOR AGGLUTINATION WITH B. TYPHOSUS

I. *The outfit*—Use a sterile, tightly stoppered or sealed, glass container with a capacity of from 10 to 15 c.c., in a mailing case conforming to the postal laws and regulations.

II. *Preparation of the specimen*—Remove the serum with a sterile pipette (a capillary pipette fitted with a small rubber bulb may be used) with precautions to prevent contamination of the clot, which should be reserved for bacteriological examination. Centrifugalize to remove the blood cells.

Results obtained with hemolyzed sera should be considered of questionable significance, since certain conditions which produce hemolysis may also affect the agglutinative properties. The clots from such specimens should be cultured. The hemolysis may be due to the development of the bacteria which were present in the blood stream.

III. *Dilutions*—Prepare the following dilutions of the serum in 0.85 per cent solution: 1:10, 1:20, 1:40, 1:80, 1:160, and higher if desired.

IV. *Agglutinating suspensions*—Employ at least two suspensions of uniform turbidity; one to demonstrate floccular and the other, granular agglutinative properties.

Preparation of Formalin-Treated Suspension to Demonstrate Floccular Agglutination — Employ a "smooth," actively motile strain of *B. typhosus*. Streak a freshly poured plate of beef-infusion agar containing no water of condensation. If, after from 18 to 20 hours' incubation at from 35 to 37° C., other than perfectly "smooth" colonies are noted, suspend two or three of the latter in small amounts of salt solution or broth and replate immediately. Repeat this process until an entirely "smooth" culture is obtained. Check the purity of the culture by microscopic examination, by determining the reaction in double-sugar medium and agglutination in *B. typhosus* anti-serum. Use a suspension of a 24 hour beef-infusion agar culture to inoculate 2 per cent beef-infusion agar in pint Blake or other bottles which will give adequate surface. If water of condensation is present on the agar, remove it with a pipette before inoculation. After from 18 to 20 hours' incubation at from 35 to 37° C., pipette into each pint Blake bottle or its equivalent 10 c.c. of 0.85 per cent salt solution containing 2 per cent of formalin and suspend the growth in this. Make Gram-stained preparations and discard suspensions which show the presence of contaminating microorganisms. Pool the suspensions in a sterile bottle; place in the refrigerator; and after 48 hours, prepare sub-cultures. Hitchens's medium is recommended for this purpose since it provides conditions favorable to both aerobic and anaerobic microörganisms.

Should growth of *B. typhosus* occur, retest, after additional refrigeration, until no evidence of viability is obtained. If considerable material settles out, decant the supernatant suspension into a fresh bottle. Adjust the suspension to a turbidity 10 times that of barium-sulphate * standard No. 3 [1] and a formalin content of 2 per cent. Determine the opacity of the suspension by comparison of diluted portions with barium-sulphate standard No. 3 and with a similar suspension previously standardized. Calculate the required amount of diluents as in the following example:

Assuming that 400 c.c. of concentrated suspension are to be adjusted and it is found that this needs to be diluted 1:12 to equal barium-sulphate standard No. 3, then:

$$\frac{400 \times 12}{10} = 480 \text{ c.c.—volume adjusted suspension}$$

or 80 c.c. of salt solution containing 2 per cent formalin are required to be added to 400 c.c. of the original suspension.

For agglutination tests, dilute with 9 parts of 0.85 per cent salt solution, thus obtaining a suspension equivalent in turbidity to barium-sulphate standard No. 3 and containing 0.2 per cent formalin.

Test the agglutinability of the suspension in comparison with a previous lot which has proved satisfactory, using, if possible, a series of human sera giving various degrees of agglutination as well as antisera produced in animals. Store in a refrigerator.

Preparation of Alcohol Treated Suspension [2] *to Demonstrate Granular Agglutination*—Employ a "smooth" strain of *B. typhosus,* preferably one which is nonflagellated. Follow the procedure outlined for the formalin treated suspension to insure smoothness and purity of the culture and inoculate the agar in pint Blake or other bottles. After from 18 to 20 hours' incubation, pipette into each pint Blake bottle or its equivalent 10 c.c. of 0.85 per cent salt solution containing 0.5 per cent phenol and suspend the growth. Make Gram-stained preparations and discard suspensions which show the presence of contaminating microörganisms. Measure the suspension in a sterile graduate and pool it in an Erlenmeyer flask. Add alcohol to give a concentration of 33.3 per cent. The volume of 95 per cent alcohol required equals the volume of the suspension multiplied by 0.54, a constant obtained from the formula:

$95\ x = 33.3\%$ (volume of the suspension $+\ x$) in which $x =$ the volume of 95 per cent alcohol which will be required

Rotate the flask slowly as the alcohol is added or stir with a sterile glass rod. Pour the alcohol treated suspension into sterile cylinders and incubate over night at from 35 to 37° C. The following morning, decant the supernatant suspension from the sediment into a sterile bottle, mix thoroughly, and prepare sub-cultures to determine the presence of contaminating microorganisms. Hitchens's medium is recommended for this purpose since it provides both aerobic and anaerobic conditions.

Adjust the turbidity of the suspension to 10 times that of barium-sulphate standard No. 3 and its alcohol content to 30 per cent. Determine the opacity of the suspension by comparison of diluted portions with barium-sulphate standard No. 3 and with a similar suspension previously standardized. Calculate the required volume of diluents as in the following example:

Assuming that 400 c.c. of suspension are to be adjusted and that this needs

* Silica or other standards of equivalent opacity may be employed.

to be diluted 1:12 to obtain the required density, then:

$\frac{400 \times 12}{10} = 480$ c.c.—volume of adjusted suspension and 80 c.c.—total volume of diluent required

$480 \times 30\% = 144$ c.c.—total volume of 100 per cent alcohol required

$400 \times 33.3\% = 133.3$ c.c.—volume of alcohol already in suspension

$144 - 133.3 = 10.7$ c.c.—volume 100 per cent alcohol to be added

$10.7 \times \frac{100}{95} = 11.3$ c.c.—volume of 95 per cent alcohol required

80 c.c. $- 11.3$ c.c. $= 68.7$ c.c.—volume of 0.85 per cent salt solution containing 0.5 per cent phenol to be added.

For agglutination tests, dilute with 9 parts of 0.85 per cent salt solution, thus obtaining a suspension equivalent in turbidity to barium-sulphate standard No. 3 and containing 3 per cent alcohol and 0.05 per cent phenol.

Test the agglutinability of the suspension in comparison with a previous lot which has proved satisfactory, using, if possible, a series of human sera giving various degrees of agglutination as well as antisera produced in animals. Store in a refrigerator.

V. *The test*—Combine equal parts (from 0.3 to 0.5 c.c. recommended) of serum dilutions and suspensions in small, clear glass tubes (11 mm. x 75 mm. is a convenient size), and shake thoroughly. For purposes of control, combine equal parts of each suspension and (a) 0.85 per cent salt solution and (b) specific dilutions of homologous antiserum. Incubate for from 18 to 20 hours at approximately 50° C.*

VI. *The reaction*—Record the degree of reaction as follows:

4+ = clear supernatant fluid—complete agglutination
3+ = clear supernatant fluid—definite agglutination
2+ = cloudy or slightly cloudy supernatant fluid—definite agglutination
+ = cloudy supernatant fluid—agglutination discernible to the unaided eye
± = questionable reaction
− = uniformly turbid suspension—no agglutination

VII. *The report*—Either of the following methods may be employed.

First method

A. Report that definite agglutination occurred—

1. When both granular and floccular agglutination (3+ or 4+) is obtained in a 1:80, or higher, dilution.
2. When either granular or floccular agglutination (3+ or 4+) is obtained in a 1:160, or higher, dilution.

B. Report that partial agglutination occurred—

1. When reactions less than those reported as definite agglutination are obtained, provided agglutination (3+ or 4+) of one or both types occurs in a 1:40 dilution.

C. Report that agglutination of diagnostic significance did not occur—

1. When reactions less than those regarded as partial are obtained.
2. When no agglutination is obtained.

or

Second method

A. Report the dilution of serum in which each type of agglutination is obtained.

In case either granular or floccular agglutination alone occurs, add one of the following statements to the report or write a letter to the physician relative to the significance of the reaction.

"Floccular but not granular agglutination occurred. This type of reaction is occasionally obtained in sera from patients having typhoid fever but is more often observed in blood from typhoid carriers or those who have re-

* This should not vary more than 2° below or above 50° C.

ceived typhoid vaccine. If the individual is ill or there is evidence that he may be a typhoid carrier, fecal specimens should be submitted for bacteriological examination."

or

"Granular but not floccular agglutination occurred. This type of reaction is observed in sera from a small percentage of patients having typhoid fever but may be obtained when there is an infection with a microörganism antigenically related to *B. typhosus*. Therefore, fecal specimens should be submitted for bacteriological examination."

EXAMINATION OF SERUM FOR AGGLUTINATION WITH B. PARATYPHOSUS A AND B

The procedure outlined for *B. typhosus* may be followed. However, the relatively low incidence of infections with microörganisms of the paratyphoid-enteritidis group in this country and the variety of species involved render the agglutination test of questionable practical value for use as a routine procedure.

BACTERIOLOGICAL PROCEDURES FOR THE ISOLATION OF BACILLI INCITING ENTERIC DISEASE

EXAMINATION OF BLOOD

I. *The outfit*—Use a sterile, tightly stoppered or sealed, glass container with a capacity of from 10 to 15 c.c., in a mailing case conforming to the postal rules and regulations.

II. *Preparation of the specimen*—Remove the serum with a sterile pipette, using precautions to prevent contamination of the clot. Reserve the serum for serological tests.

III. *Cultural examination*—Transfer the clot to 8 or 10 c.c. of bile medium (Conradi's modified). Sub-culture after from 40 to 48 hours' incubation at from 35 to 37° C. and at intervals thereafter for at least 3 weeks, unless bacterial incitants of enteric disease are isolated sooner.

EXAMINATION OF FECES AND URINE

I. *The outfit*

A. Use a tightly stoppered or sealed, glass tube or jar, with a capacity of from 20 to 30 c.c. in a mailing case conforming to the postal laws and regulations. The tube or jar should contain from 8 to 10 c.c. of 30 per cent glycerol in 0.6 per cent salt solution.

B. Give instructions for the collection of the specimens, printed either on the history form or on a separate slip included in the outfit.

C. Provide a swab or wooden spoon, for the collection of feces, of which about 1 gm. should be added to from 8 to 10 c.c. of glycerol solution.

D. From 8 to 10 c.c. of urine should be added to from 8 to 10 c.c. of glycerol solution.

NOTE: When specimens of feces or urine can be examined within a very short time (1 or 2 hours) after collection, and when urine has been collected aseptically, the use of a preservative is, of course, unnecessary.

II. *Plating*

A. *Feces*—If undiluted feces is submitted, combine 1 part with from 8 to 10 parts of fluid medium, preferably 30 per cent glycerol solution, and allow it to stand for from 10 to 15 minutes so that the coarse particles will settle. Use not less than 4 plates, at least 1 of which shall contain medium favorable to the development of dysentery bacilli (eosin-methylene-blue agar or a modification of Endo's agar) and another, that which is inhibitory to *B. coli* but favorable to typhoid and paratyphoid bacilli (Krumwiede's brilliant-green agar). Usually, the amount of fecal suspension which can be transferred with a loop 4 mm. in diameter on each plate will give well isolated colonies. Streak the material on each plate with a large wire loop, bent wire needle or sterile glass rod. Incubate the plates for from 18 to 20 hours at from 35 to 37° C.

B. *Urine*—Streak the specimen as received on one plate of eosin-methylene-blue or Endo's agar and one of brilliant-green agar. Add from 2 to 3 c.c. of the remainder to from 8 to 10 c.c. of bile medium (Conradi's modified). Incubate the latter for from 18 to 20 hours at from 35 to 37° C. and streak one plate of eosin-methylene-blue or Endo's agar and one of brilliant-green agar.

For purposes of control, streak portions of each type of plating medium with cultures of *B. typhosus*, *B. paratyphosus* A and B, *B. dysenteriae*, and *B. coli.*

CRITERIA FOR IDENTIFICATION OF SPECIES

The criteria for identification of bacterial incitants of enteric disease and other Gram-negative bacilli found in feces have, for convenience, been summarized in Table I. The procedures necessary to determine the significant characteristics will be discussed separately.

I. *Colonial characteristics*—These should be considered only as a means for selecting those colonies from which sub-cultures are to be made. If a tentative report seems essential, a suspension of microörganisms from a colony may be tested for agglutination in a loopful of a dilution of antiserum on a glass slide, but a final report should be based on adequate criteria for identification of the species.

II. *Differential media for sub-cultures*—Pick characteristic colonies to Russell's double-sugar medium. Stab the butt and streak the surface of the slant. Record the reactions after incubation for from 18 to 20 hours at from 35 to 37° C. (For purposes of control, inoculate tubes of this medium with standard strains of *B. typhosus*, *B. paratyphosus* A and B, *B. dysenteriae*, and *B. coli.*)

III. *Morphology*—Prepare films on glass slides or, if slide agglutination tests are performed, allow these preparations to dry and then fix them and stain by Gram's method. All the microörganisms listed in Table I are relatively small, evenly staining, Gram-negative bacilli without spores. If the stained preparations show any evidence of contamination, streak the culture on blood agar as well as Endo's agar since the contaminating microörganism may be inhibited on the latter. Prepare a hanging drop to study the motility. Transfer one loopful of a 1 to 3 hour broth culture to a cover slip and invert over it a hollow-ground slide which has been ringed with vaseline. Examine with a high-power dry objective.

IV. *Macroscopic slide agglutination test*—Transfer to a glass slide one loopful of appropriate antiserum diluted as indicated by previous standardization and a loopful of a corresponding dilution of serum from a normal animal of the species used for the production of the antiserum. Transfer, with a small loop, growth from a colony on the plating medium or from Russell's double-sugar agar to the normal serum and after emulsifying, transfer a loopful to the antiserum. Tilt the slide slowly and observe over a black background for clumping.

A report should not be based on the results of this test unless the species indicated has been isolated from a previous specimen from the same patient. The test may be very useful, however, in the selection of antisera in which to perform macroscopic tube agglutination tests.

V. *Macroscopic tube agglutination test*—Inoculate beef-extract broth from the double-sugar slant and incubate at from 35 to 37° C. (usually from 2 to 4 hours) until the turbidity is equivalent to that of barium-sulphate standard No. 3, or suspend the growth from a beef-extract or beef-infusion agar

TABLE I

CRITERIA FOR IDENTIFICATION OF BACTERIA INCITING ENTERIC DISEASE AND OTHER GRAM-NEGATIVE BACILLI FOUND IN FECES*

Species	Reaction in double-sugar medium	Reaction in media containing: Dextrose	Maltose	Mannitol	Lactose	Saccharose	Xylose	Rhamnose	Dulcitol	Motility	Indol production	Reaction in litmus milk	Serological reaction
B. typhosus	+†	A	A	A	—	—	$\overline{A}$	—	$(\overline{A})$	Motile[1]	Not produced	A ± – or Alk ±	Agglutination in *B. typhosus* antiserum
B. dysenteriae Shiga	+	A	$\overline{A}$	—	—	—	—	—	—	Nonmotile	Not produced	A ± – or Alk ±	
Schmitz	+	A	$\overline{A}$	—	—	$\overline{A}$	—	A	—	Nonmotile	Produced	A ± – or Alk ±	Agglutination in polyvalent and/or monovalent antisera for members of the group
Flexner°	+	A	$\overline{A}$	A	—	$\overline{A}$	—	$(\overline{A})$	$(\overline{A})$	Nonmotile	Variable	A ± – or Alk ±	
Sonne	+	A	A	A	–A	–A	—	A	—	Nonmotile	Not produced	A or AC	
B. dispar	+	A	A	A	–A	$\overline{A}$	$\overline{A}$	$\overline{A}$	$\overline{A}$	Nonmotile	Produced	A or AC	Of questionable value
B. alkalescens	+	A	A	A	—	—	A	A	A	Nonmotile	Produced	Alk or A to Alk	Agglutination in *B. alkalescens* antiserum
B. paratyphosus A	⊕	AG	AG	AG	—	—	—	AG	AG	Motile[1]	Not produced	A or Alk	Agglutination in, and absorption of, agglutinative properties from *B. paratyphosus* A antiserum
Paratyphoid-enteritidis group‖	⊕	AG	AG	AG	—	—	AG (—)	AG	AG (—)	Motile[1]	Not produced	A to Alk	Agglutination in polyvalent and/or monovalent antisera for members of the group. Absorption of agglutinative properties is necessary for the identification of species.
B. morgani No. 1	⊕	AG	—	—	—	$\overline{AG}$	—	—	—	Motile[1]	Produced	– or Alk	Of questionable value
B. coli	⊕	AG	AG	AG	AG	$\overline{AG}$	AG	AG	AG	Motile[1]	Produced	AC	Of questionable value

* Only those species which do not liquefy gelatin are included. Variations, especially in fermentative properties, which have not been indicated may be occasionally encountered, particularly after long cultivation on artificial media.

† Occasionally acid throughout.

[1] Nonmotile strains sometimes found, especially when freshly isolated.

° The mannitol-fermenting group.

‖ *B. paratyphosus* B, *B. enteritidis* and other closely related species.

\+ = Acid butt, neutral or alkaline slant, no gas.

⊕ = Acid and gas in butt, neutral or alkaline slant.

⊕ = Acid and gas throughout.

A = Acid.

– = No perceptible change. –A = Acid produced slowly. AG = Acid and gas.

$\overline{A}$ = No change or acid. $(\overline{A})$ = Usually no change, occasionally acid.

AG (—) = Usually acid and gas, occasionally no change.

$\overline{AG}$ = No change or acid and gas.

A ± = Weak acid.

Alk = Alkaline.

Alk ± = Weak alkaline.

AC = Acid and coagulation.

slant which has been incubated for from 18 to 20 hours, in 0.85 per cent salt solution making the turbidity equivalent to that of barium-sulphate standard No. 3. Combine 0.3 c.c. amounts of either of these and of appropriate antisera diluted as indicated by previous standardization. For purposes of control, combine 0.3 c.c. amounts of each culture to be tested with salt solution and of dilutions of each antiserum with a suspension of its homologous species. Incubate the tests at from 35 to 37° C. for 2 hours and then leave in the refrigerator over night before reading, except in the case of *B. alkalescens* and *B. dysenteriae* Sonne. Incubate tests for identification of these two species at approximately 50° C. for from 18 to 20 hours and read. Follow the procedure outlined under serological procedures for recording the degree of reaction.

VI. *Fermentative properties*—Inoculate carbohydrate peptone water containing Andrade indicator and observe at frequent intervals during 14 days' incubation at from 35 to 37° C. Test this medium each time a new lot is prepared with standard strains of the species included in Table I. When there is any doubt concerning the production of gas, inoculate dextrose broth in a Durham fermentation tube and observe at intervals during 1 week's incubation at from 35 to 37° C. Incubate one tube of the same lot of medium inoculated with *B. coli* and one uninoculated and observe at the same time as the culture being studied. When gas production is to be determined from carbohydrates which are easily hydrolyzed by heat, use medium sterilized by filtration distributed in Smith fermentation tubes.

VII. *Production of indol*—Inoculate a tube of Dunham's peptone water with the culture to be tested and incubate for 4 days at from 35 to 37° C. Incubate at the same time one tube of this medium inoculated with *B. coli*, one with *B. typhosus*, and one uninoculated. Add 1 c.c. of ether to each and mix well by rotating the tubes. Allow a few drops of Ehrlich's reagent to run down the side of the tube to form a layer between the ether and the peptone water. A definite ring varying from rosy pink to deep red indicates the presence of indol.

VIII. *Liquefaction of gelatin*—Transfer the culture with a needle, stabbing the medium to the bottom of the tube. Incubate at from 35 to 37° C. for 2 weeks unless evidence of liquefaction is observed sooner. To determine liquefaction, immerse the tube in ice water or leave it in the refrigerator for 30 minutes.

IX. *Reaction in litmus milk*—Inoculate a tube of litmus milk with the culture to be tested and record the reaction at frequent intervals during incubation at from 35 to 37° C. for 14 days. For purposes of comparison, incubate at the same time an uninoculated tube of the same lot of litmus milk.

X. *Absorption tests*—Occasionally, when the results of agglutination tests are indefinite or when cross-agglutination is obtained, it is necessary to employ absorption tests to determine the species.

Combine equal parts of a dilution of antiserum and (a) a suspension of the homologous species and (b) a suspension of the unidentified culture grown for from 18 to 20 hours at from 35 to 37° C. on beef-infusion agar. The serum dilution and the turbidity of the absorbing suspensions are determined by standardization. Incubate the mixtures for 3 hours at approximately 50° C., inverting the tubes occasionally to insure contact of serum and microörganisms. Leave them in the refrigerator over night and centrifugalize at high speed for 1 hour

or until the supernatant fluid is clear. Prepare dilutions of the supernatant fluid, and combine 0.3 c.c. of each with 0.3 c.c. of a suspension in 0.85 per cent salt solution (comparable in turbidity to barium-sulphate standard No. 3) of (a) the species homologous to the serum used and (b) the culture to be identified. Incubate the tests at from 35 to 37° C. for 2 hours and leave them in the refrigerator over night before reading the reactions. Incubate tests with absorbed *B. alkalescens* and *B. dysenteriae* Sonne antisera at approximately 50° C. for from 18 to 20 hours and read.

For control purposes, perform tests, at the same time, with sera which have not been subjected to absorption.

It may be unnecessary to study all of the characteristics listed in Table I, but when a strain differs from the standard in any property it should be studied most carefully. This should be done also before reporting members of the paratyphoid-enteritidis group since strains of *B. coli* and of the so-called paracolon group may be agglutinated in sera prepared with certain of the pathogenic species. The similarity in biochemical and other properties and the close serological relationship of members of the paratyphoid-enteritidis group render the identification of individual species an arduous procedure. Furthermore, this is of little practical value because of the relatively low incidence in this country of infections with members of this group. The diagnostic significance of *B. alkalescens*, *B. dispar*, and *B. morgani* No. 1 has not been established but they are encountered with sufficient frequency to warrant recognition.

STANDARDIZATION OF ANTISERA

I. *Macroscopic slide agglutination tests*—Dilute the antiserum 1:25, 1:50, 1:100, 1:200, and higher if necessary, with 0.85 per cent salt solution. Perform macroscopic slide agglutination tests with a standard strain of the homologous species and with the other species of the bacilli inciting enteric disease. Test a similar series of dilutions of serum from a normal animal of the same species as that in which the antiserum was produced. If agglutination is obtained in the latter, procure a satisfactory strain of the species and repeat the tests. Select for use in routine tests the lowest dilution of antiserum in which definite agglutination occurs with the homologous but none with the heterologous species.

II. *Macroscopic tube agglutination tests*—Dilute the antiserum 1:100, 1:250, 1:500, 1:1,000, 1:2,000, and higher if necessary, with 0.85 per cent salt solution. Perform macroscopic tube agglutination tests with a standard strain of the homologous species and with the other species of the bacilli inciting enteric disease. Test a similar series of dilutions of serum from a normal animal of the same species as that in which the antiserum was produced. If agglutination is obtained in the latter, procure a satisfactory strain of the species and repeat the tests. Select for use in routine tests the two lowest dilutions of antiserum in which definite agglutination occurs with the homologous but none with the heterologous species.

III. *Absorption tests*—A serum dilution of 1:50 is usually found satisfactory for absorption tests. If this does not give satisfactory results, other dilutions may be tested.

Inoculate infusion agar in two pint Blake or other bottles of convenient size with the culture homologous to the serum being standardized, and incubate at from 35 to 37° C. for from 18 to 20 hours. Suspend the growth in a small amount of 0.85 per cent salt solution, and determine its turbidity in relation to that of barium-sulphate standard No. 3. Absorbing

TABLE II

Designation of Absorbing Suspensions	*Ratio to Turbidity of $BaSO_4$ Standard No. 3*	*Dilution Necessary to Give a Suspension Equal in Turbidity to $BaSO_4$ Standard No. 3*	
		Suspension Part	*Salt Solution Part*
No. 1	Same	1	0
No. 2	2 x	1	1
No. 3	10 x	1	9
No. 4	20 x	1	19
No. 5	50 x	1	49
No. 6	100 x	1	99
No. 7	200 x	1	199
No. 8	400 x	1	399

suspensions are designated as No. 1, No. 2, etc., in Table II.

The turbidity of absorbing suspensions varies with different species and different sera. Therefore, in initial standardization, test with three or four suspensions chosen arbitrarily. Combine equal parts of the suspensions and a dilution of the antiserum which is not more than one-eightieth of its titer.

Incubate the tests at approximately 50° C. for 3 hours, inverting the tubes occasionally to insure contact of microorganisms and serum. Leave the tubes in the refrigerator over night and then centrifugalize at high speed for 1 hour, or until the supernatant fluid is clear. Prepare dilutions of the supernatant fluid and combine 0.3 c.c. of each with 0.3 c.c. of a suspension in 0.85 per cent salt solution (comparable in turbidity to barium-sulphate standard No. 3) of a beef-infusion agar culture of the species homologous to the antiserum. Incubate the tests at from 35 to 37° C. for 2 hours and leave them in the cold room over night before reading, except in the case of *B. dysenteriae* Sonne and *B. alkalescens*. Incubate tests with these species at approximately 50° C. for from 18 to 20 hours, and record the reactions. Select as a standard for use in routine tests an absorbing suspension which completely removes the agglutinative properties through at least one-twentieth of the titer of the serum.

STANDARDIZATION AND TESTING OF DIFFERENTIAL MEDIA

Whenever a new lot of dye or indicator is purchased for use in any medium, test the medium with representative strains of the bacterial species inciting enteric disease as well as *B. coli*. Also, test the efficiency of each new lot of medium.

In the case of brilliant-green agar, the amounts of dye necessary must be determined for each lot of agar base. Prepare 6 plates each of agar containing 0.1, 0.2, 0.3, 0.4, and 0.5 per cent of a 0.1 per cent aqueous solution of brilliant-green dye. Inoculate portions of each set of plates with standard strains of *B. coli, B. typhosus, B. paratyphosus* A, *B. paratyphosus* B, and *B. dysenteriae* Shiga; and, if possible, fecal specimens from cases of typhoid fever or persons known to be carriers of *B. typhosus*. After incubation for from 18 to 20 hours at from 35 to 37° C., observe the growth and select for a "weak" dye agar, that dilution which best inhibits the growth of *B. coli* without materially affecting the growth of typhoid and paratyphoid bacilli. Choose for a "strong" dye agar that dilution which inhibits the growth of *B. coli* completely or nearly so, and the growth of *B. typhosus* and *B. paratyphosus* not more than 50 per cent.

Whenever a new lot of basic fuchsin is obtained, standardize it as follows.

for use in Endo's agar: To 100 c.c. amounts of agar base, add 0.05 c.c., 0.1 c.c., 0.2 c.c., and 0.3 c.c. of a saturated alcoholic solution and pour 6 plates from each. Inoculate portions of each set of plates with standard strains of *B. coli, B. typhosus, B. paratyphosus* A, *B. paratyphosus* B and *B. dysenteriae* Shiga and, if possible, fecal specimens from cases of typhoid fever or persons known to be carriers of *B. typhosus*. Examine the plates after incubation for from 18 to 20 hours at from 35 to 37° C. and select that amount of dye with which the sharpest differentiation of *B. coli* and the bacilli inciting enteric disease is obtained and which has no appreciable inhibitory action on the latter.

PREPARATION OF MEDIA AND REAGENTS

Details in regard to the preparation of media and reagents are given in the order in which they are mentioned in the preceding methods. Formulae for media in common use, such as, infusion and extract agar and broth, are not included. It is assumed that these would be available in any laboratory undertaking this type of work.

The source of dyes and chemicals which have been found satisfactory is indicated. Products which are shown to be equally reliable may be obtained from other manufacturers.

Hitchens Semifluid Agar [3]

Beef, ground	500 gm.
Distilled water	1 kg.
Peptone	10 gm.
Sodium chloride	5 gm.
Dextrose	1 gm.
Agar	1.5 gm.

Weigh the meat and add the required quantity of water. Stir thoroughly, and infuse over night in the cold room. Strain through cheesecloth, press off the juice from the meat with a meat press, and weigh. Heat gradually in a steam kettle or over a free flame, stirring occasionally, until the infusion is clear and almost colorless and the coagulum is brown. Strain through cheesecloth and filter through paper. Make up the weight to give 1 kg. of infusion for each 500 gm. of meat. Adjust the reaction to from pH 8.0 to 8.2. Add the peptone and the salt, and autoclave at 121° C. for from 30 to 40 minutes, depending on the bulk of the material. Make up the weight to that of infusion plus the other ingredients. Add the dextrose, dissolve, and filter through paper until clear.

Dissolve the agar in 50 c.c. of distilled water by heating in the autoclave at 121° C. for 30 minutes. Bring the filtered broth to the boiling point and add 40 c.c. of the melted aqueous agar per kg. Line the bottom of a Buchner funnel with two layers of filter paper cut to fit. Over these, place a thick pad of nonabsorbent cotton. Using a small amount of negative pressure and keeping the medium hot, filter it into a suction flask. Dispense in bottles or tubes in moderately tall columns and sterilize by steam at 121° C. for 20 minutes.

Conradi's Bile Medium (Modified) [4] *

Dehydrated ox bile	100 gm.
Glycerol	100 gm.
Peptone	20 gm.
Distilled water to make	1 kg.

* Slightly modified for purposes of convenience.

Combine the ingredients and dispense in from 8 to 10 c.c. amounts in wide-mouth tubes or jars. Sterilize by steam at 121° C. for 15 minutes.

Glycerol Sodium-chloride Solution [5]

Sodium chloride	6 gm.
Distilled water to make	1 kg.
Glycerol, T.P. (Schering-Kahlbaum, Berlin)	

Dissolve the salt in part of the water and make up to 1 kg. To 7 volumes of the 0.6 per cent salt solution, add 3 volumes of glycerol. Filter through paper.

Dispense in from 8 to 10 c.c. amounts in the tubes or jars used in the outfits to be distributed for the collection of specimens. Sterilize by steam at 121° C. for 20 minutes. After removing from the autoclave, allow the jars or tubes to cool to from 50 to 60° C., fasten the caps or stoppers securely, and leave standing over night in an inverted position. Discard leaky jars or tubes. Test the viability of the bacilli inciting enteric disease in each lot of glycerol solution prepared.

Eosin-methylene-blue Plating Medium [6]

Distilled water	1 kg.
Agar	20 gm.
Sodium chloride	5 gm.
Beef extract	3 gm.
Peptone	10 gm.

Dissolve the agar in about 90 per cent of the water by heating in an autoclave for 30 minutes at 121° C. Dissolve the peptone, salt, and extract in the remainder of the water by heating in a water-bath. Combine the two parts and make up the weight to that of all the ingredients. Adjust to from pH 7.0 to 7.2. Dispense in bottles of convenient size and sterilize by steam at 121° C. for from 30 to 40 minutes, depending on the volume. When plates are to be poured, melt the agar in steam at 100° C. To each 100 c.c. of medium add 5 c.c. of a sterile 10 per cent lactose solution, 1 c.c. of a 4 per cent aqueous solution of eosin, and 2 c.c. of a 0.5 per cent aqueous solution of methylene blue. Mix well before pouring into plates.

Eosin, 4 Per Cent, Aqueous Solution

Eosin (National Aniline)	40 gm.
Distilled water to make	1,000 c.c.

Dissolve the dye in part of the water and make up to volume. Store in a glass stoppered bottle.

Methylene Blue, 0.5 Per Cent, Aqueous Solution

Methylene blue (National Aniline)	5 gm.
Distilled water to make	1,000 c.c.

Dissolve the dye in part of the water and make up to volume. Store in a glass stoppered bottle.

Lactose Solution

Lactose	100 gm.
Distilled water to make	1 kg.

Dissolve the lactose in a small amount of distilled water and make up to volume. Filter through paper and dispense in convenient amounts in bottles or tubes. Sterilize by steam at 121° C. for 15 minutes.

Endo's Plating Medium—Robinson and Rettger's Modification [7, 8]

Distilled water	1 kg.
Agar	25 gm.
Peptone	10 gm.
Beef extract	5 gm.
Sodium carbonate (10 per cent solution)	10 c.c.
Lactose	10 gm.
Sodium bisulphite (10 per cent solution)	10 c.c.
Fuchsin (saturated alcoholic solution)—determined by standardization	

Add the water to the agar, reserving about 10 per cent or 100 gm. per kg. to dissolve the peptone and beef extract. Dissolve the agar by heating in an autoclave for 30 minutes at 121° C. Dissolve the peptone and extract by heating in a water-bath. Combine the two parts and make up the weight to that of all the ingredients. Filter through a thin layer of absorbent cotton. Add the solution of sodium carbonate. Check the reaction, which should be between pH 7.8 and 8.0. Heat in streaming steam at 100° C. for 10 minutes. Add the lactose and the fuchsin and mix well. Add sodium bisulphite and mix well again. Dispense in bottles in convenient amounts and sterilize by steam at from 115 to 116° C. for 20 minutes. Melt the agar and pour plates as needed.

Sodium Carbonate, 10 Per Cent Solution

Anhydrous sodium carbonate	100 gm.
Distilled water to make	1 l.

After dissolving the sodium carbonate in the water, standardize by titration with 1N hydrochloric acid.

Sodium Bisulphite, 10 Per Cent, Aqueous Solution

Sodium bisulphite	100 gm.
Distilled water to make...	1,000 c.c.

Dissolve the bisulphite in part of the water in a 1,000 c.c. volumetric flask. Make up to volume. Filter through paper and use immediately or store in a wide-mouth bottle under a ¾" layer of mineral oil. Fit the bottle with a siphon and when solution is required, dispense desired amount, using the siphon.

Fuchsin, Basic, Saturated Alcoholic Solution

Fuchsin, basic (National Aniline)	10 gm.
Alcohol, 95 per cent, to make	100 c.c.

Dissolve the dye in part of the alcohol and make up to volume. Shake well. Allow to stand over night, filter through paper and store in a glass stoppered bottle.

Brilliant-green Plating Medium [9]

Distilled water	1 kg.
Agar	15 gm.
Sodium chloride	5 gm.
Beef extract	3 gm.
Peptone	10 gm.
Andrade's indicator	30 c.c.

Dissolve the agar in about 90 per cent of the water by heating in an autoclave for 30 minutes at 121° C. Dissolve the peptone, salt, and extract in the remainder of the water by heating in a water-bath. Combine the two parts and make up the weight to that of all the ingredients. Filter through a thin layer of absorbent cotton.

Weigh the filtered agar and add 3 per cent of Andrade's indicator. Determine the reaction and, if it lies between pH 7.2 and 7.6, do not adjust. Otherwise, adjust to pH 7.6. Dispense five 100 c.c. amounts in bottles for purposes of standardization. Dispense the remainder in from 100 to 400 c.c. amounts in bottles of a suitable size. Sterilize by steam at 121° C. for from 30 to 40 minutes depending on the volume. As soon as the material is removed from the autoclave, add to each of the five 100 c.c. amounts of agar 5 c.c. of a sterile solution containing 2 per cent dextrose and 20 per cent lactose. To the first bottle add 0.1 c.c., to the second 0.2 c.c., to the third 0.3 c.c., to the fourth 0.4 c.c., and to the fifth 0.5 c.c. of a 0.1 per cent aqueous solution of brilliant-green dye. (These amounts may vary with different lots of brilliant-green dye.) From each bottle pour 6 plates to be employed for standardization.

When brilliant-green agar plates are to be prepared from a lot which has been standardized, melt the agar in steam at 100° C. and add a sufficient amount of a sterile solution containing 2 per cent dextrose and 20 per cent lactose to give 0.1 and 1 per cent respectively, of these cabohydrates. Add the required amounts of 0.1 per cent aqueous solution of brilliant green as determined by standardization.

Andrade's Indicator [10, 11]

Acid fuchsin (Coleman and Bell)	
Distilled water	1,000 c.c.
1N NaOH	100 c.c.

It is necessary to test each lot of fuchsin purchased. Make up a small amount of indicator using the same amount of fuchsin as was used with the preceding lot for the preparation of the indicator (from 1.5 to 5 gm. per l.). Incorporate this indicator in a very small amount of double-sugar medium and test it with cultures of the bacterial species inciting enteric disease. If the uninoculated medium of suitable reaction is decidedly pink when cold, less fuchsin should be used.

Lactose-dextrose Solution

Dextrose	20 gm.
Lactose	200 gm.
Distilled water to make...	1 kg.

Dissolve the carbohydrates in a small amount of distilled water and make up to volume. Filter through paper and dispense in convenient amounts in bottles or tubes. Sterilize by steam at 121° C. for 15 minutes.

Brilliant Green, 0.1 Per Cent, Aqueous Solution

Brilliant green (Coleman and Bell)	0.5 gm.
Distilled water to make. . .	500 c.c.

Dissolve the dye in part of the water and make up to volume. Store in a glass-stoppered bottle in the dark.

Russell's Double-sugar Medium[12]

Distilled water	1 kg.
Agar	15 gm.
Sodium chloride	5 gm.
Beef extract	3 gm.
Peptone	10 gm.
Andrade's indicator	30 c.c.
Lactose	10 gm.
Dextrose	0.5 gm.

Dissolve the agar in about 90 per cent of the water by heating in an autoclave for 30 minutes at 121° C. Dissolve the peptone, salt, lactose, dextrose, and extract in the remainder of the water by heating in a water-bath. Combine the two parts and make up the weight to that of all the ingredients. Filter through a thin layer of absorbent cotton.

Weigh the filtered agar and add 3 per cent of Andrade's indicator. Determine the reaction and, if it lies between pH 7.2 and 7.6, do not adjust. Otherwise adjust to pH 7.6. Dispense in tubes and after sterilization by steam at 121° C. for 12 minutes, cool in a slanted position so that the agar will form a butt about 1″ deep and a slant from 1.5 to 2″ long.

Peptone Water with Carbohydrate[13]

(For determination of acid production)

Distilled water	1 kg.
Peptone	10 gm.
Sodium chloride	5 gm.
Andrade's indicator	10 c.c.

Add the peptone and salt to the water, and dissolve, warming if necessary. Filter through paper. Add the indicator and adjust to from pH 7.4 to 7.5. Dispense in convenient amounts in bottles and sterilize by steam at 121° C. for 20 minutes.

Add sterile solutions of carbohydrates to give 1 per cent and dispense in from 1 to 2 c.c. amounts in small tubes, using precautions to avoid contamination. Solutions of carbohydrates sterilized by filtration should be employed, except in the case of those which are relatively stable at high temperatures. Seal with paraffin to prevent evaporation.

Beef-extract Broth with Carbohydrate[14]

(For determination of gas production)

Distilled water	1 kg.
Beef extract	3 gm.
Peptone	5 gm.
Carbohydrate	5 gm.

To the required quantity of water add the extract and peptone. Dissolve by heating over a free flame, stirring frequently. Adjust to pH 7.0. Boil for about 5 minutes. Make up lost weight. Add the sugar, dissolve, and filter through paper until clear. Dispense in Durham fermentation tubes with outer tube 150 by 19 mm. and inner tube 75 by 11 mm. in size. Fill a small amount of broth (about 1.5 cm. depth) into the large tube, fill the small tube completely and invert in the large tube. Sterilize by steam at 121° C. for 12 minutes.

Dunham's Peptone Solution (Modified)[15]

(For determination of indol production)

Distilled water	1 kg.
Peptone (Parke-Davis) . . .	10 gm.
Potassium nitrate C.P.	0.1 gm.

Dissolve the peptone in the water, warming if necessary, and adjust to pH 7.0. Add the nitrate, and filter through paper. Dispense in from 5 to 6 c.c. amounts in tubes and sterilize by steam at 121° C. for 15 minutes.

Parke-Davis peptone, or some other brand known to be satisfactory for indol production, must be used.

Ehrlich's Reagent

(For determination of indol production)

Paradimethylamino benzaldehyde (Pfanstiehl) . . .	1 gm.
Absolute alcohol	95 c.c.
Concentrated hydrochloric acid	20 c.c.

Store in a glass-stoppered bottle.

This reagent should be used within 2 months after preparation.

Litmus Milk

Milk, certified or Grade A, unpasteurized.	1 quart
Litmus solution, 10 per cent, aqueous	2 per cent by volume

Pour the milk into a separatory funnel and place in the refrigerator over night to allow the cream to rise. Draw off the fat-free milk and add the required volume of litmus solution. If necessary, adjust the reaction to neutral to the indicator. Dispense in from 5 to 6 c.c. amounts in tubes and sterilize by steam at 100° C. for 20 minutes on 3 successive days.

Litmus Solution

Purified litmus	10 gm.
Distilled water to make. .	100 c.c.

Grind the litmus in a mortar. Transfer to a 100 c.c. volumetric flask, add about one-half of the water, and shake vigorously. Allow to stand and shake again. Repeat. Finally add sufficient water to make up to volume. Allow to settle over night, decant the clear solution, and centrifugalize until clear. Add 0.5 per cent chloroform and store in a glass-stoppered bottle in a refrigerator.

Purified litmus may be purchased or may be prepared [16] as follows:

Commercial litmus	20 gm.
Alcohol, 85 per cent.	500 c.c.
(445 c.c. of 95 per cent alcohol diluted to 500 c.c.)	

Powder the litmus in a mortar. Transfer to an evaporating dish and add 100 c.c. of alcohol which has been heated to boiling on a steam bath. Place the evaporating dish in the steam bath and digest with frequent stirring for 15 minutes. Centrifugalize and discard the alcoholic supernatant solution. Extract the precipitate in this manner 5 times. Transfer the extracted litmus to a shallow dish and dry in a vacuum desiccator over concentrated sulphuric acid.

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MARION B. COLEMAN, *Referee*

Tentative Methods for the Isolation and Identification of Hemolytic Streptococci*

As aids to diagnosis, laboratory methods depend upon definite knowledge of the etiological relationship of a microörganism to a disease process. That hemolytic streptococci incite many quite different and characteristic infectious processes is well established, but no specific relationship of any of the various streptoccoci to a particular disease has as yet secured general acceptance. Knowledge of the biological characters, however, has advanced steadily and to a stage of real, though limited, usefulness for the isolation and identification of hemolytic streptococci. Certain difficulties arise in the practical

* Report of the Referee on Recognition and Significance of Hemolytic Streptococci in Infectious Diseases for the Standard Methods Committee on Diagnostic Procedures and Reagents.

application of this knowledge because of the variety of procedures and the lack of essential information in the literature. Therefore, as a preliminary step in the standardization of methods, tentative procedures which have proved practical in actual use for the preparation and examination of specimens for hemolytic streptococci and for their identification have been formulated; they are submitted for study and criticism.

GENERAL DIRECTIONS

I. PREPARATION OF SPECIMEN FOR EXAMINATION

A. Specimens are collected in sterile glass containers, stoppered or sealed to prevent leakage and contamination. Each specimen container bears a label on which is written the patient's name and, if sent to the laboratory by mail, it is packed in such a way as to comply with the postal regulations. Specimens of milk are kept iced until examined. If this is impossible, one volume of glycerol [1] — Schering Kahlbaum — is mixed thoroughly with two volumes of milk as soon as the sample is taken.

B. Each specimen is accompanied by a history slip on which the following data are recorded: kind of specimen and date of collection, identification and pertinent clinical history of the patient or subject, and the name and address of the physician.

C. Specimens are opened and numbered one at a time in order to avoid the possibility of interchanging them. This number is recorded on the specimen label and on the history slip. The records of all examinations made of the specimen are marked with this number.

II. APPARATUS AND TECHNIC FOR EXAMINATION

A. All glassware, solutions, and media are sterile and handled with the usual precautions to prevent contamination.

B. Incubators are maintained at a temperature of from 34 to 36° C. and are equipped with thermometers which register maximum and minimum temperatures.

C. Solid media are inoculated with a wire loop. Plate cultures are made by streaking one loopful (1 mm.) of material in parallel rows with particular care to avoid breaking the surface of the medium. Liquid media are inoculated by adding with a pipette suitable volumes of 18 hour broth culture.

D. With the following exceptions, inoculated media are incubated under aerobic conditions: blood-agar plates used for isolation and fishings from these plates to broth of strains which fail to grow aerobically.

E. Preparations for microscopic examination are made by spreading a loopful of material evenly on a glass slide and are stained by Gram's method. Films of *B. coli* and of *Staphylococcus aureus* are placed on each slide as controls of the staining procedure. When pus cells are present, the staining reactions of their nuclei serve as an excellent control.

F. Seed cultures for the inoculation of the various test media are incubated for 18 hours and examined microscopically before use, and are streaked on blood agar after use to assure their purity. If any evidence of contamination is noted, the differential tests are repeated with cultures freed from contaminants by plating and fishing.

ISOLATION

I. MEDIA *

A. Blood agar [2] for plates and slants: Preparation—

Beef heart, ground........	1 kg.
Distilled water	2 kg.
Agar, shredded No. 40, A. H. Thomas Co.	40 gm.
Sodium chloride, C.P.....	10 gm.
Peptone, "Difco" Bacto...	10 gm.

* The preparation of the different media is still under investigation, with a view to simplifying the procedures.

Mix the meat and 1 kg. of water thoroughly and infuse over night at 5° C. Skim the fat and heat the infusion to 45° C., hold at between 45 and 50° C. for 1 hour, and then boil for ½ hour. Stir frequently throughout the heating process. Remove the coarse particles by straining through a colander, and filter through glass wool which has been washed thoroughly in distilled water. Add distilled water to make 1 kg. and adjust the infusion to pH 7.4. Boil for 5 minutes and filter again through glass wool and make up any loss in weight with distilled water.

Dissolve the agar and sodium chloride in 1 kg. of water by heating in an autoclave at 121° C. for 30 minutes. Mix equal parts of this solution and the infusion with the peptone and adjust the reaction to pH 7.4 if necessary. Filter through glass wool, dispense the medium in suitable quantities, and sterilize by steam at 121° C. for 30 minutes.

Melt 900 c.c. of the beef-heart-infusion agar, cool to 45° C., and add 50 c.c. of sterile defibrinated horse, rabbit, or human blood. Dispense in tubes or Petri plates. After solidification, leave at room temperature for 48 hours, and examine for contamination. Store at 5° C.

Testing—Test each lot of medium by inoculating plates with several strains of streptococci of known hemolytic activity; include in this test at least one strain, the hemolytic activity of which is inhibited by the presence of small quantities of dextrose in the medium. Incubate under aerobic conditions, and examine for hemolysis after 24 hours. Do not use the medium unless all control strains induce distinct hemolysis.

B. Beef-infusion agar, 0.12 per cent,[3] *for blood cultures:*

Beef, ground	500 gm.
Distilled water	1 kg.
Peptone, "Difco" Bacto..	10 gm.
Sodium chloride, C.P......	5 gm.
Dextrose, anhydrous C.P., Merck	1 gm.
Agar, 3 per cent aqueous...	40 c.c.

Mix the meat and water thoroughly and infuse over night at 5° C. Strain through cheesecloth and press the juice from the meat in a meat press. Heat to 45° C. in a water-bath and hold at that temperature for 1 hour. Boil for 50 minutes, stirring occasionally, and filter through glass wool which has been washed thoroughly in distilled water. Add distilled water to bring weight to that of the water added originally, and adjust to from pH 8.0 to 8.2. Dissolve the peptone, salt, and dextrose in the infusion. Filter through glass wool until clear. Warm the filtrate, add the melted agar, and filter through glass wool if necessary. Dispense and sterilize by steam at 121° C. for 30 minutes.

C. Beef-infusion broth[4]*:*

Beef, ground	500 gm.
Distilled water	1 kg.
Peptone, "Difco" Bacto...	10 gm.
Sodium chloride, C.P.......	5 gm.

Mix the meat thoroughly with approximately 90 per cent of the water, reserving the remainder to dissolve the peptone and salt. Infuse over night at 5° C., strain the infusion through cheesecloth, and press the juice from the meat with a meat press. Dissolve the peptone and salt in the water by heating in a water-bath, and add to the infusion. Adjust the reaction to neutral to phenolphthalein. Boil for 30 minutes. Check the reaction and, if it is more acid than pH 8.0, adjust and boil for 3 minutes. Filter through paper and make up weight with distilled water to the total of all ingredients, excluding the meat. Dispense and sterilize by steam at 100° C. for 40 minutes on 3 successive days. Incubate for 48 hours, and examine for contamination before use.

II. PLATING OF SPECIMEN

Plate each specimen in duplicate on blood-agar medium (see Isolation I A)

by streaking the surface of each plate with one loopful of material. Incubate one plate under anaerobic conditions in a hydrogen jar [5] containing as a control a tube of methylene-blue indicator* and examine for growth after 48 hours; incubate the other under partial carbon-dioxide tension † and examine after 24 hours; if no growth of hemolytic streptococci is present, examine again after 48 hours.

A. Blood:

Keidel tube—Open the tube in a flame and with a bulb Pasteur pipette or a 20 c.c. syringe (needle, 17 gauge, 1½"), transfer approximately 15 c.c. of the contents to a test tube. From this material make a slide preparation; transfer from 3 to 5 c.c. to each of two 100 c.c. bottles containing 45 c.c. of 0.12 per cent beef-infusion agar which has been warmed to 37° C., and streak a loopful on each of two blood-agar plates. If no growth is present on these plates after incubation, make stained preparations and inoculate plates from the 0.12 per cent beef-infusion-agar cultures after 2, 7, and 14 days' incubation.

If the patient is available to the laboratory, inoculate bottles of 0.12 per cent beef-infusion-agar medium with the freshly drawn blood and proceed as indicated above.

Clotted blood—Pipette the serum from the clot without centrifugalization and place the clot in a 200 c.c. bottle containing 110 c.c. of 0.12 per cent beef-infusion agar which has been warmed to 37° C., and incubate. Make a slide preparation from and plate on blood agar the material left in the tube after the removal of the clot. If no growth is present on these plates after incubation, make stained preparations and inoculate plates from the 0.12 per cent beef-infusion-agar culture after 2, 7, and 14 days' incubation.

B. Nose and throat cultures:

Loeffler's coagulated serum medium—If the specimen consists of an inoculated slant of Loeffler's coagulated serum medium, incubate for from 18 to 24 hours. Make a slide preparation by passing a loop lightly over the entire surface of the medium and spreading the material evenly in a drop of water on a slide. Suspend a representative loopful of culture in 2 c.c. of 0.85 per cent salt solution and plate on blood agar.

If the swab with which the culture was taken is returned with Loeffler culture, treat as described below.

Swab—Wash the swab in 2 c.c. of 0.85 per cent salt solution, and streak both the moist swab and the washings on one half of each plate. Make stained preparations from both the swab and its washings.

If the patient is available to the laboratory, inoculate the blood-agar plates with the swab at the bedside. Return plates to the laboratory for incubation and examination. Also return the swab and, if no growth of hemolytic streptococci occurs on the plates inoculated at the bedside, examine the swabs as indicated above.

C. Purulent discharges:

Tube specimen—Make a stained preparation and plate on blood agar. If the examination of stained preparation indicates the presence of a large number of microörganisms, dilute a portion of the material with 0.85 per cent salt solution before plating.

Swab—Proceed as in the examination of swabs—nose and throat cultures.

D. Spinal fluid:

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* Methylene-blue indicator: Mix in a test tube equal parts of N/160 sodium hydroxide, 0.015 per cent aqueous methylene blue, and 6 per cent sterile aqueous solution of dextrose. Boil until the methylene blue is reduced, and place in the hydrogen jar immediately before it is sealed for the removal of the oxygen. The indicator remains colorless as long as anaerobic conditions are maintained.

† Place the inoculated plates in a 2½ liter museum jar or other container of similar volume which can be sealed tightly. Put a tube containing approximately 0.6 gm. of sodium carbonate in the jar in an upright position and with a pipette add 10 c.c. of 10 per cent sulphuric acid. Seal the jar as soon as the reaction begins to subside.[6]

Centrifugalize at approximately 2,000 r.p.m. for ½ hour, remove the supernatant fluid, and make a stained preparation from the sediment. Draw the remainder of the sediment into a fine capillary pipette, place 1 drop on each plate, and streak with a wire loop. If microscopic examination of the stained preparation indicates the presence of Gram-positive cocci, inoculate also a tube of beef-infusion broth (see Isolation I C).

E. Milk:

Centrifugalize at approximately 2,000 r.p.m. for ½ hour to separate the cream. Draw off the skim milk with a capillary pipette, and discard. Make a stained preparation and plate on blood agar the mixed cream and sediment.

If haste is not required, store the milk specimen at 5° C. until the cream has separated. Make a stained preparation and plate the gravity cream.

III. FISHING COLONIES

Examine the plates thoroughly after incubation for isolated hemolytic colonies of characteristic appearance. Fish several colonies, transferring part of the growth from each colony to a blood-agar slant and a tube of beef-infusion broth* (see Isolation I C). If hemolytic colonies are present, but are overgrown, suspend some of the growth from these areas in 0.85 per cent salt solution, and replate. If the growth is heavy—few or no isolated colonies—dilute a portion of the specimen with 0.85 per cent salt solution and replate.

Incubate fishings to blood-agar slants until growth is obtained, usually 24 hours, examine the growth macroscopically for homogeneity and hemolytic activity, and store at 5° C. for further study if necessary.

After incubation, examine fishings to broth microscopically for the presence of Gram-positive cocci which form chains. Plate on blood agar and incubate under aerobic conditions. Examine the growth on the plates for homogeneity and hemolytic activity.

IDENTIFICATION

The extent to which the procedures for identification and differentiation are carried is determined by the type of specimen and the purpose of the examination. For microörganisms from specimens of blood and spinal fluid and, in many instances, purulent discharges, a study of the morphology and hemolytic activity alone suffices to establish the etiological relationship. With strains from milk and from nose and throat cultures, particularly when they are examined in connection with the investigation of outbreaks of streptococcus infections, however, additional data are essential.

The presence in the normal nose and throat, and in the udders of cows, of hemolytic streptococci, usually considered of little importance as incitants of infectious disease in man, has necessitated the formulation of procedures by which the common human pathogens may be differentiated. In general, these strains are hemolytic not only when grown on blood agar but also when examined by means of the tube test. They also produce a pH of 4.6 or above in 1 per cent dextrose broth, ferment trehalose, fail to ferment sorbitol, or to hydrolyze sodium hippurate, and, according to the results of precipitation tests, are members of Group A described by Lancefield.

I. TUBE TEST FOR HEMOLYSIS [7, 8]

Add 0.5 c.c. of a 15 hour beef-infusion broth (see Isolation I C) culture to 0.5 c.c. of 5 per cent horse, rabbit, or human red-blood cells washed 3 times in 0.85 per cent salt solution. Mix

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* If a strain is encountered fishings of which fail to grow in this medium, add to the broth approximately 10 per cent of normal serum or 5 per cent of defibrinated blood.

thoroughly and incubate in a water-bath for 2 hours at 37° C. Examine for hemolysis after ½, 1, and 2 hours. For purposes of control, include two tubes, one containing 0.5 c.c. of uninoculated broth mixed with 0.5 c.c. of cells, and the other containing 0.5 c.c. of culture of a known hemolytic strain and 0.5 c.c. of cells. At the end of the 2 hour incubation period, centrifugalize any tubes in which hemolysis appears incomplete or is absent, and compare them with the uninoculated broth control.

II. DIFFERENTIAL TESTS FOR THE IDENTIFICATION OF STRAINS COMMONLY ENCOUNTERED IN HUMAN INFECTIONS

A. Final hydrogen-ion concentration [9, 10]:

Medium: Dextrose beef-infusion broth—

Beef, ground	500 gm.
Distilled water	1 kg.
Peptone, "Difco" Proteose	20 gm.
Sodium chloride, C.P.	5 gm.
Dextrose, anhydrous C.P., Merck, 20 per cent solution	50 c.c.

Mix the meat and water thoroughly and infuse over night at 5° C. Strain through cheesecloth and press the juice from the meat in a meat press. Boil for 30 minutes, stirring occasionally. Strain through cheesecloth and filter through paper. Dissolve the peptone and salt in the filtrate and make up weight with distilled water to the sum of all the ingredients, excluding the meat. Adjust the reaction to pH 8.2 and heat at 121° C. for from 30 to 40 minutes, depending on the bulk of the material. Make up weight, and check the reaction. If it is more acid than pH 8.2, readjust and boil for 3 minutes. Filter through paper until clear and sterilize by steam at 121° C. for 20 minutes.

Add the heat-sterilized 20 per cent dextrose solution to the medium aseptically and dispense in 5 c.c. amounts in 125-by-13-mm. tubes. Incubate the finished medium for 2 days and examine for contamination.

Procedure—Inoculate a tube of dextrose beef-infusion broth with 0.2 c.c. of broth culture, and incubate for 96 hours. Determine the hydrogen-ion concentration colorimetrically.

Colorimetric determination of hydrogen-ion concentration—Pipette 2 c.c. of freshly boiled and cooled distilled water and 1 c.c. of the supernatant fluid from dextrose-broth culture into each of two clear hard-glass tubes, 75-by-11-mm. To one of these add 0.1 c.c. of methyl red [11, 12] * or other indicator of suitable range, and mix thoroughly the contents of both tubes. In a comparator block superimpose the tube containing the diluted culture and indicator upon a tube of distilled water; superimpose the other tube upon a color standard prepared by adding 1 c.c. of standard buffer solution [13, 14] of suitable hydrogen-ion concentration and 0.1 c.c. of indicator to 2 c.c. of distilled water. Record as the hydrogen-ion concentration of the culture that of the standard which it most nearly matches in color. (Because of the instability of methyl-red indicator, fresh "standards" should be prepared daily.)

B. Hydrolysis of sodium hippurate [15]:

Medium: Sodium-hippurate pepsin broth—[16]

Distilled water	1 kg.
Peptone, Parke-Davis Bacteriologic	10 gm.
Pepsin, U.S.P., Eimer and Amend	5 gm.
Calcium chloride, C.P.	0.03 gm.
Ferric chloride, C.P., Baker, 1 per cent solution	1 drop
Sodium hippurate, C.P., Eimer and Amend	5 gm.

Dissolve all the ingredients except the sodium hippurate in the water, divide in two equal parts, and adjust one to

* Methyl red is prepared according to the procedure given in the reference to Standard Methods, except that 60 per cent alcohol is used in place of distilled water for the final dilution.

pH 7.1. To the other part—500 gm.—of medium, add the sodium hippurate and adjust to pH 7.1. Boil both for 2 minutes, add distilled water to compensate for loss in weight, and filter through paper. Dispense in 5 c.c. amounts in 125-by-13-mm. tubes and sterilize by steam at 121° C. for 20 minutes.

Procedure—Inoculate a tube of sodium-hippurate pepsin broth with 0.2 c.c. of broth culture and incubate for 48 hours, or longer if growth is poor. Inoculate and incubate similarly a tube of the same medium to which no sodium hippurate has been added. To 2 c.c. of these cultures add 0.5 c.c. of 12 per cent ferric-chloride solution, prepared by dissolving the salt in distilled water containing 2 c.c. of concentrated hydrochloric acid per liter. Mix thoroughly and let stand for from 5 to 10 minutes before recording the presence or absence of hydrolysis—presence indicated by the formation of a heavy precipitate. With each series of cultures tested, include as controls two strains, one of which does and the other of which does not hydrolyze sodium hippurate.

C. Fermentation of trehalose and sorbitol [17, 18]*:*

Medium: 3 per cent chlor-phenol-red beef-infusion broth—

Beef-infusion broth (see Identification IIA, *without* dextrose)	100 c.c.
Chlor-phenol-red [11, 12]	3 c.c.
Trehalose, "Difco" standardized, 10 per cent solution, sterilized by filtration	10 c.c.
or	
d-Sorbitol, "Difco" standardized, 10 per cent solution, sterilized by heat	10 c.c.

Add the indicator to the sterile broth and heat by steam at 100° C. for 20 minutes. Cool and add either trehalose or sorbitol aseptically and dispense in approximately 2 c.c. amounts in 75-by-11-mm. tubes. Incubate for 48 hours, and examine for contamination. For control purposes dispense similarly an equal number of tubes of the medium containing the indicator but no added carbohydrate.

Procedure—Inoculate a tube of 3 per cent chlor-phenol-red beef-infusion broth containing each of the test substances with 0.1 c.c. of culture. As a control on the amount of natural sugar in the medium, inoculate similarly a tube of the medium to which no carbohydrate has been added. Incubate for 1 week and record the presence or absence of fermentation after 1, 2, and 7 days.

D. Group-precipitation test [19]*:*

1. Extracts of strains

Medium: Infusion-free peptone broth —[20, 21]

Sodium chloride, C.P.	5 gm.
Dipotassium phosphate, C.P.	1 gm.
Monopotassium phosphate, C.P.	1 gm.
Peptone, Parke-Davis Bacteriologic	20 gm.
Cane sugar	2 gm.
Distilled water to make	1 kg.

Dissolve the sodium chloride in part of the water, add peptone, and heat slightly to dissolve. Dissolve the potassium salts separately in small quantities of water, and add to the peptone-salt solution. Add water to make 1 kg., and adjust to pH 7.8. Heat at 121° C. for 40 minutes, add cane sugar, and make up with water any loss in weight. Filter through paper until clear, dispense in 450 c.c. amounts in 1 liter Erlenmeyer flasks, and sterilize by steam at 121° C. for 30 minutes.

Procedure — Inoculate infusion-free peptone broth* with approximately 8 c.c. of broth culture, and incubate for 48 hours. Examine a stained preparation and streak on a blood-agar plate. If microscopic examination reveals no evidence of contamination, separate the bacterial cells by centrifugalization, and discard the supernatant broth. Wash

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* For certain strains which fail to grow in this medium, beef-infusion broth (see Identification IIA, containing 0.02 per cent dextrose) is used.

the cells by suspending them in 25 c.c. of 0.85 per cent salt solution and centrifugalize. After discarding the salt-solution washings, mix with the sediment 4.5 c.c. of 0.85 per cent salt solution containing sufficient N/1 hydrochloric acid to make a final concentration of N/20 hydrochloric acid. Heat in a boiling water-bath for 20 minutes. Cool under running water, centrifugalize, pipette off the supernatant fluid, and discard the sediment. Adjust the supernatant fluid with N/1 sodium hydroxide to from pH 7.0 to 7.2 by the spot-plate method.* Centrifugalize and pipette off the clear supernatant fluid for use in the test if a pure culture of hemolytic streptococci grows on the blood-agar plate inoculated with the infusion-free peptone broth culture.

2. *Immune sera*

Preparation of formalin-treated culture—Inoculate a suitable volume, from 50 to 100 c.c., of broth (see Identification II A, containing 0.02 per cent dextrose) and incubate for 18 hours. Examine a stained preparation, and streak on a blood-agar plate. If no evidence of contamination is obtained from the examination of the stained preparation, separate the bacterial cells from the broth by centrifugalization and resuspend in one-twentieth the volume of 0.85 per cent salt solution containing 0.25 per cent formalin. Store at 5° C. for 48 hours and, if no contaminants are noted in the plate culture, plate the formalinized suspension on blood agar. Retest after further storage if growth occurs. Dilute formalin-treated culture with 0.85 per cent salt solution to the original volume of the culture immediately before each inoculation.

* Place one loopful of phenol red 11, 12 in each of several depressions in a porcelain reaction plate. With a 0.2 c.c. pipette add 0.04 c.c. of the adjusted extract, mix thoroughly, and compare with the color standards prepared by mixing similar amounts of indicator and standard buffer solutions of pH 7.0 and 7.2 respectively. Add N/1 sodium hydroxide or N/1 hydrochloric acid as indicated. (From 0.12 to 0.14 c.c. of N/1 sodium hydroxide is usually required to adjust 4.5 c.c. of the extract.)

Immunization of rabbits—Inoculate rabbits weighing approximately 2,000 gm. with formalin-treated cultures of strains representative of the various groups. Inject intravenously 1 c.c. of culture daily on 6 successive days, and take trial bleedings 5 days after the 6th inoculation. Test sera with extracts of homologous and heterologous strains which represent types belonging to the same group. Administer additional series of injections as indicated from the results of tests of trial bleedings, and bleed out animals from the 5th to the 7th day following the last injection.

3. *Precipitation test*

Pipette 0.1 c.c. of undiluted serum into 100-by-8-mm. tubes and add without mixing an equal volume of the extract* to be tested. Include as controls tubes containing similar volumes of each extract and 0.85 per cent salt solution, of 0.85 per cent salt solution and each serum, and of homologous extract and serum. Record the presence of ring formation after the test has stood for 10 minutes at room temperature or in a water-bath at 37° C. If no ring formation occurs with any of the group sera, incubate for 2 hours in a water-bath at 37° C. and store over night at 5° C. before recording the final results.

Reporting Results

A written report on the examination of each specimen is sent to the physician who submitted the specimen. The presence of hemolytic streptococci is reported as soon as the microörganisms are isolated in pure culture. In those instances in which the differential tests are performed, this report is followed by one recording the results of further procedures for identification.

Report " Hemolytic streptococci were found " or " were not found," depending upon whether or not Gram-positive cocci

* Depending upon the potency of the immune sera, it may be necessary to increase or decrease the amount of antigen used in the test.

which form chains and hemolyze red-blood cells are isolated.

Report "Hemolytic streptococci were found which belong to the group commonly encountered in human infections" when hemolytic streptococci are isolated which have a final pH of 4.6 or higher in 1 per cent dextrose broth, ferment trehalose, fail to ferment sorbitol, and to hydrolyze sodium hippurate and which, according to precipitation tests, are members of Group A.

Report "Hemolytic streptococci were found which differ in certain of their serological properties from those commonly encountered in human infections" when hemolytic streptococci are isolated which do not belong to Group A according to precipitation tests. Such strains may be similar to or differ from the common human pathogens in biochemical properties.

SPECIAL TESTS

In the investigation of outbreaks of hemolytic streptococcus infections, especially those in which epidemiological data point to a carrier as the source of the incitant, differentiation of members of the group commonly encountered in human infections is occasionally essential. Until the practical value of various serological procedures for the typing of strains [22, 23] is established, the demonstration of differences in their biochemical and toxigenic properties may yield helpful information. Furthermore, the study of the toxigenic characters may prove of very practical value, not only in the control of epidemics but also in the treatment of cases, if and when the hemolytic streptococci are classified according to toxin group and thus in relation to the antitoxic or antibacterial sera, rather than by disease entity.

I. FERMENTATION OF LACTOSE, MANNITOL, AND SALICIN [24]

Medium: 3 per cent chlor-phenol-red beef-infusion broth—

Beef-infusion broth *without* dextrose	100 c.c.
Chlor-phenol-red [11, 12]	3 c.c.
Lactose, "Difco" standardized, 10 per cent solution sterilized by filtration	10 c.c.
Mannitol, Merck, 10 per cent solution sterilized by heat	10 c.c.
Salicin, U.S.P., Merck, 10 per cent solution sterilized by filtration	10 c.c.

Prepare the medium as described under Identification IIC, substituting lactose, mannitol, or salicin for the trehalose or sorbitol.

Procedure (see Identification II C)—Test for toxin production strains which have not been differentiated by this test.

II. TOXIGENIC PROPERTIES [25, 26, 27]

A. Preparation of filtrates:

Medium: Beef-infusion broth (see Identification II A) containing 0.02 per cent dextrose.

Procedure—Inoculate a 50 c.c. Erlenmeyer flask containing 20 c.c. of broth and incubate for 48 hours. If the examination of a stained preparation reveals characteristic morphology, plate on blood agar, add 0.5 per cent phenol—C. P., Baker—and sterilize by passage through a Seitz or Berkefeld filter. Store at 5° C. If no contaminants are noted on the blood-agar plate, test the filtrate by the intracutaneous inoculation of susceptible rabbits.

B. Test for toxin production:

Animal—Select white-skinned rabbits—weight, at least 3,000 gm.; age, 1 year or older—and remove the hair from a small area on one flank with electric clippers. Dilute the standard toxin with 0.85 per cent salt solution so that 0.1 c.c. of the diluted material contains 5 skin test doses of toxin. Heat a portion of the diluted toxin for 2 hours in a boiling water-bath and inject 0.1 c.c. of the heated and of the unheated material intracutaneously in the depilated area on the rabbit. Examine the rabbit

24 hours after inoculation and record the size of the reaction and the degree of redness and swelling at the site of each injection. For the determination of toxigenic activity, it is necessary to use rabbits in which 5 skin test doses of the standard toxin induce definite reactions of approximately 2 cm. in diameter and in which the heated toxin fails to react.

Procedure—Make a 1:100 dilution in 0.85 per cent salt solution of the filtrate of the strain to be tested and heat a portion of the dilution for 2 hours in a boiling water-bath. With a 1 c.c. tuberculin syringe (needle, 26 gauge, ⅜"), inject 0.1 c.c. of the heated filtrate, followed by 0.1 c.c. of the unheated material, intracutaneously in separate areas of the depilated back or sides of a susceptible rabbit. On the same animal inject 5 skin test doses of standard toxin, heated and unheated. After 24 hours, record the size of the reaction and the degree of redness and swelling at the site of each inoculation. If 0.001 c.c. of unheated filtrate (0.1 c.c. of 1:100 dilution) induces a reaction measuring 1 cm. or more in diameter and the heated filtrate fails to react, consider the strain toxigenic.

If the strains cannot be differentiated by their ability or failure to produce toxin, test the filtrates of the toxigenic strains for neutralization by antistreptococcus serum.

C. *Test for neutralization by antistreptococcus serum:*

Prepare dilutions of standard toxin in 0.85 per cent salt solution so that 5 skin test doses are contained in 0.1 and 0.05 c.c. respectively. Divide the first dilution in two parts and heat one for 2 hours in a boiling water-bath. Add the second dilution to the standard antistreptococcus serum so diluted with physiological salt solution that 0.05 c.c. contains sufficient serum to neutralize from 5 to 10 skin test doses of homologous toxin.

Make dilutions of 1:100 and 1:50 of the toxin to be tested and heat a portion of the 1:100 dilution for 2 hours in a boiling water-bath. Add the 1:50 dilution to an equal volume of serum diluted as for the control toxin-serum mixture.

After the toxin-serum mixtures have been allowed to stand at least ½ hour at room temperature, inject 0.1 c.c. of each intracutaneously in a susceptible rabbit. Inoculate the same animal with 0.1 c.c. amounts of heated and unheated toxins and of serum alone, so diluted that 0.1 c.c. contains sufficient serum to neutralize from 5 to 10 skin test doses of homologous toxin. Use a different 1 c.c. tuberculin syringe (needle, 26 gauge, ⅜") for the injection of the serum control, for the toxin-serum mixtures, and for the heated and unheated toxins. After 24 and 48 hours record the size of the reaction and the degree of redness and swelling at the site of each inoculation.

Consider the test toxin neutralized by the antistreptococcus serum under the following conditions: no reactions at the site of the injections of heated toxins, of serum alone, and of mixtures of serum and test and standard toxins; reactions more than 1 cm. in diameter induced by both test and standard toxins.

For further information concerning the identification and differentiation of the streptococcus toxins, consult references 25, 26, and 27 in the bibliography.

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JULIA M. COFFEY, *Referee*

Tentative Methods for the Diagnosis of Meningococcus Meningitis and Identification of the Meningococcus*

DEFINITION

It is necessary, first of all, to define what is meant by a meningococcus in order to establish definite criteria for its identification. Such a definition should include only such characteristics as are essential for identification. Reducing these to their very lowest terms we may, for practical purposes, begin with the following:

> The meningococcus is a Gram-negative coccus, usually occurring in pairs with flattened adjacent sides, which ferments dextrose and maltose with the production of acid.

The cocci may occur singly and sometimes in groups, and the individual cells may vary greatly in size and in intensity of staining, though they are always Gram-negative. Strains that fail to ferment maltose or dextrose, or both of these sugars, may be encountered. Such strains usually acquire this property sooner or later, though it may be lacking at a time when it is desired to make a diagnosis of meningococcus infection. In our recent studies of 610 strains of meningococci we have found no strain that has failed to ferment these two sugars at some time during our investigations.

Opinions as to the adequacy of the above brief definition will not be unanimous. Four other characteristics would be included by many workers with meningococci:

> Characteristic colony formation, lack of pigment production, growth only at incubator temperatures, and agglutinability by polyvalent anti-meningococcus serum.

As a rule the smooth translucent colonies of the meningococcus are quite characteristic, but occasional strains of true meningococci are found that immediately after isolation may be as large as a dime, very convex, or even opaque.

Most are agreed that meningococci never produce yellow pigment. The only dissenting voices are of those who consider *Neisseria flavescens* [1] to be a form of meningococcus,[2, 3] though both culturally and serologically *N. flavescens* seems quite distinct.

That meningococci grow only at incubator temperature is, as a rule, a safe generalization to make. We have

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* Report of the Referee on the Diagnosis of Meningococcus Meningitis and the Identification of the Meningococcus for the Standard Methods Committee on Diagnostic Procedures and Reagents.

encountered a few strains that grow well at room temperature, and have had 3 strains, typical meningococci in all other respects, that were maintained for nearly a year by transplanting, incubating, and storing entirely at 20° C.

Some strains are inagglutinable when they are first recovered from patients. Practically all of these can be coaxed to agglutinate later, though they do not do so in time to supply a criterion for diagnosis. Many experienced workers do not consider agglutination necessary for identification of the meningococcus.

A more complete definition of the meningococcus would therefore be:

A Gram-negative coccus, usually occurring in pairs with flattened adjacent sides, which ferments dextrose and maltose with the production of acid, forms characteristic colonies, does not produce yellow pigment, usually grows at incubator temperatures, and is, as a rule, at some time agglutinable by polyvalent antimeningococcic serum.

Microörganisms having all of the above characteristics are certainly meningococci, but not all meningococci have each and every one of these characteristics.

The inclusion of agglutinability by polyvalent antimeningococcic serum in the definition of the meningococcus will be opposed by many on the very logical grounds that new serological groups, unrepresented in the serum, may be encountered; and also that strains fulfilling other requirements are considered meningococci whether they are agglutinated or not.

DISTRIBUTION

The normal habitat of the meningococcus is the naso-pharynx. In meningococcus infections it may be found in the cerebrospinal fluid, either intracellularly or extracellularly, in the blood, or in the petechiae of the skin. These are the usual sources from which the meningococcus is obtained.

DIAGNOSTIC PROCEDURES

Cerebrospinal fluid—This is usually obtained by lumbar puncture, the special needle for this purpose being inserted in the 3rd or 4th lumbar space. The size of the needle used depends to a certain extent upon the size of the patient, though sometimes a very thick and viscid fluid will make a large needle necessary in a child. An 18 gauge needle of 3 or 4 inches in length is the size in most common use, though 17 gauge may be necessary if the fluid is very thick, and 19 gauge is preferred by some. In small children, 20 and even 22 gauge of 2 inch length may be indicated. In cases where the spinal canal is blocked, cisternal puncture may be resorted to, and special needles are made for this purpose. This is not often necessary for an early diagnostic puncture.

The spinal fluid should be collected directly into several tubes, preferably at least three. This is especially important when the first fluid is blood tinged, for the presence of blood interferes with some of the examinations to be made. In some laboratories the rule is to use the second tube for cultures, and the third for cell counts, glucose determinations, and other chemical tests. Other individuals prefer the last tube for cultures. It is difficult to get an even suspension for counting if conical centrifuge tubes are used to collect the fluid.

The amount of fluid withdrawn, whether or not it is under increased pressure, and its appearance, *i.e.*, whether blood tinged or yellow, the degree of cloudiness, etc., should be recorded, and the fluid should then be sent immediately to a laboratory for examination. It should be kept warm, if possible, in this interval.

There are certain laboratory procedures which must be done immediately if they are to be of value. Chief among these is the cell count. The sample of

fluid should be free from blood, and the distribution of the cells should be even. Sometimes the fluid may be placed directly, without dilution, in a counting chamber, 9 large squares counted, and the result multiplied by 10/9 to obtain the number of cells found in 1 cu. mm. If the cells are too numerous to count by this method, the fluid may be diluted in a "white counting" pipette, as for a regular leucocyte count.

Special detailed directions for counting cells in cerebrospinal fluid may usually be found accompanying the counting chambers. The pamphlet prepared by the Arthur H. Thomas Company to accompany the Levy Chamber with the improved Neubauer ruling directs that the diluting fluid be drawn up to the mark "1" on the usual Thoma white cell pipette, and that the spinal fluid then be drawn up into the bulb and to the engraved mark above the bulb. After mixing, the first 2 or 3 drops are discarded, a subsequent drop placed in the counting chamber, and *5 minutes* allowed for the cells to settle. All cells in the entire ruling are counted and multiplied by 10/9 to ascertain the number of cells in 1 cu. mm. A special diluting fluid for cerebrospinal fluids is:

Methyl violet	0.2 gm.
Glacial acetic acid	10 c.c.
Distilled water	90 c.c.

This should be filtered to insure absence of artefacts.

Some workers feel that all spinal fluids should be diluted, even though only slightly turbid, to insure the absence of all red cells.

The practical value of a cell count is questioned by Dr. J. B. Neal[4] on the following grounds: it is difficult to obtain a uniform mixture of cells, not only because they settle out rapidly, but because the cell content varies among the several tubes collected; thus comparison of the count from day to day may be of no value or even misleading. Dr. Neal's opinion on this matter is also shared by others.

A differential count of the spinal fluid cells should also be made at this time. With very cloudy fluids smears for this purpose can be made without centrifugation; if the fluid is only slightly cloudy it may be centrifuged first and the sediment used. It must be remembered that leucocytes are fragile and that centrifugation hastens their destruction. Wright's stain, used as for blood smears, or May-Grünwald followed by Giemsa may be employed.

The May-Grünwald stain can be purchased by the pint ready for use. The method, as used by Dr. John Hays Bailey at the Municipal Contagious Disease Hospital in Chicago, is as follows:

1. Flood the slide with the stain, leave it on for 3 minutes, and then pour off. The slide may be washed with distilled water, but this is unnecessary. Do not blot. The preparation is not over-stained if left longer, *provided that it does not become dry.*
2. The diluted Giemsa is then poured on it (for 1–10 Giemsa, 10 minutes is average; for 1–15, 20 minutes is best. The methyl alcohol used for the Giemsa *must* be acetone free).
3. Wash thoroughly with distilled water from a wash bottle until the preparation has a pink color.

The differential count is a special aid in diagnosis with spinal fluids that are only slightly turbid. The predominance of polymorphonuclear leucocytes will aid in ruling out tuberculous meningitis, poliomyelitis, encephalitis, and lymphocytic choriomeningitis (aseptic meningitis, or serous meningitis).

Quantitative determinations of sugar in spinal fluid are done routinely in many laboratories, and are considered to be very important, not only as an aid to diagnosis, but in prognosis and in following the course of the infection.[4] Sugar determinations should be done at once and cannot be made in a blood-

tinged fluid. An adaptation of the method of Folin and Wu[5] to cerebrospinal fluids is found in the laboratory manual of Kolmer and Boerner,[6] and is quoted at the end of this report.

Direct precipitation tests upon the cerebrospinal fluid may often be of great value in arriving at an early diagnosis. For such a test to be successful it is important that the serum used should be rich in precipitins and that the spinal fluid should be obtained before serum therapy is begun.

Rake[7] has described such a test in which he has used monovalent rabbit sera especially high in specific group precipitins, and thus he has obtained information as to the "type" of meningococcus involved within a period of 2 hours instead of having to wait 2 or 3 days to ascertain this. He emphasizes the fact that negative results are apt to be obtained with spinal fluids in which the meningococci are few, thus causing very little specific substance to be present. His technic, which is also suitable for use with polyvalent sera, is essentially as follows:

One-tenth c.c. of serum is placed in a precipitation tube, and 0.1 c.c. of spinal fluid is layered over it. It is examined at once for a "ring" at the point of junction and incubated at 37° C. A reading is again made after 1 hour and then the tube is thoroughly shaken and replaced in the water-bath. Another reading for precipitate is made at 2 hours and the tubes are then placed in the icebox over night, at which time a final reading is made.

A stained smear of the centrifuged spinal fluid sediment is an important factor in early diagnosis. Dr. Scott, of the British Ministry of Health, reports that it is much easier to find meningococci in such smears if they are stained with watery, methylene blue or carbolthionin, and that smears so stained should always be looked at first, and a Gram-stained preparation examined after this. In some laboratories only the Gram-stained preparation is made. The flattened Gram-negative diplococci may be very abundant, both within and without the leucocytes; on the other hand, it may require careful search to detect them, and sometimes they cannot be found. A half hour is none too long to look for them. These stained smears should be made and examined as soon as possible.

Care should be taken not to jump at the conclusion that any Gram-negative bacteria seen are meningococci, for the Pfeiffer bacillus is very pleomorphic in spinal fluid and some Gram-positive cocci may seem Gram-negative in such smears. If Gram-negative diplococci are found they should be reported as such, and not called meningococci without further identification.

Further identification consists in cultivating the organism on a suitable medium, and examining its morphology in pure culture, its cultural characteristics, and its action upon dextrose and maltose, as well as its failure to ferment saccharose and levulose. The identity of the microörganism may be reported at this point. Corroboratory evidence can be obtained by agglutination with polyvalent serum, and this is especially valuable in the case of strains in which fermentative powers are not well developed. It must be remembered that some freshly isolated strains are inagglutinable. It is not absolutely necessary that the strain should agglutinate with polyvalent serum in order to be called a meningococcus.

The culture medium used for isolation of the meningococcus depends much on the laboratory or individual using it. Our own preference at the National Institute of Health is for 5 per cent rabbit's blood agar, made with a meat infusion base, and for a modification of the Hitchens'[8] simple semisolid 0.15 per cent agar medium made

from a beef infusion broth of pH = 7.4.* Some laboratories prefer adding 0.1–0.2 per cent dextrose to these media. Workers at the Rockefeller Institute use the following three media for isolation from spinal fluid, emphasizing that they must be both moist and warmed to 37° C.: (a) 4 per cent rabbit's blood "pneumococcus agar" plates, (b) semi-solid ascitic agar tubes, and (c) serum dextrose agar slants. They also favor planting two sets of these media and incubating one set under slightly increased CO_2 pressure. After the organism is isolated they prefer the rabbit's blood "pneumococcus agar" plate for identification.

For primary cultures the New York City Laboratories inoculate the following: red blood streak plate, glucose semi-solid stab, nutrient broth, coagulated blood agar slant, and a plain agar slant for control. They report that the largest number of positive cultures is obtained in the semi-solid medium.

The laboratories of the Municipal Contagious Disease Hospital in Chicago found a simple semi-solid agar medium so successful that they have discontinued the use of any other, using only it for isolation from spinal fluids.

The New York State Laboratories employ blood agar plates and a dextrose semi-solid medium, the plates being incubated in 5–10 per cent CO_2.

The British Ministry of Health reports inspissated egg as the favorite medium for isolation from spinal fluid, especially if the meningococci are scanty, or if the fluids have been sent from a distance, but prefer 10–20 per cent serum agar or 5 per cent blood agar for identification.

Thus we see that although there may be considerable variation in the details of technic in the isolation of meningococci from spinal fluid, the blood agar plate and the tube of semi-solid agar, with or without enrichment, remain the general favorites in practically all hands. All are agreed that a generous inoculum should be used; many insist that only centrifuged sediment should be used, though others use the uncentrifuged spinal fluid when the meningococci seem to be especially abundant in the stained smear.

The spinal fluid itself as a medium should not be ignored. Incubating it at 37° C. over night often results in a tremendous multiplication of the meningococci so that their detection in smears and their cultivation are made much easier. The New York State Laboratories incubate the sediment remaining after making primary cultures, and plate it daily on 3 successive days. The importance of the spinal fluid itself as a medium is recognized by many laboratories and is of special value in places where proper media are often hard to obtain. Cultures are often obtained from shipped fluids more than 24 hours old if large inocula are used. The British Ministry of Health recommends that specimens of spinal fluid that are to be shipped be mixed with an equal quantity of dextrose broth and incubated for 12 hours before being sent. Most workers try to keep the spinal fluids warm while they await examination, but Dr. Josephine Neal states that she gets her best results by keeping them in an icebox rather than in an incubator.

For fermentation reactions most laboratories seem to prefer a solid medium. A favorite is a 10 per cent ascitic fluid agar containing 1 per cent of the desired carbohydrate and phenol red, litmus, or andrade as indicator (medium 10, New York State and British Ministry of Health). Five per cent serum is added by some instead of the ascitic fluid, and the Rockefeller Institute adds 5 per cent hemolyzed blood to a beef heart agar base.

* Formulae for these media and for others to be described will be found at the end of this report.

Not all laboratories prefer solid media. The Municipal Contagious Disease Hospital laboratory in Chicago uses the ordinary semi-solid agar medium with carbohydrate and indicator added. At the National Institute of Health in Washington, we prefer a simple semi-solid medium made of peptone; 0.15 per cent agar, salts, and carbohydrate, with brom-thymol-blue added—a medium devised by Enlows.[9] This is not a rich medium, and for initial cultures from spinal fluid we have added carbohydrate and indicator to the usual hormone semi-solid media (medium 11). If such cultures are made directly from spinal fluid, it is frequently possible to finish the complete identification of the meningococcus in less than twenty-four hours. Most meningococci grow nicely on the Enlows medium, but especially delicate strains are placed on serum-carbohydrate-agar (medium 10) slants with added indicator (brom-thymol-blue).

For maintenance of cultures of meningococci there are three types of media in favor: (a) semi-solid agar, with or without ascitic fluid and with various modifications, (b) serum dextrose agar slants, and (c) egg slants.

(a) In a simple 0.15 per cent agar medium, with a meat infusion base, cultures of meningococci will usually need to be transplanted about every 2 weeks, though some may live much longer. At the National Institute of Health we have adopted Murray's [10] suggestion that small amounts of KCl and $CaCl_2$ be added. Cultures upon this modified medium are transplanted about once a month (medium 3). With the addition of ascitic fluid (medium 5) this period between transplants may be lengthened to 2 months (New York State Laboratories). There is no doubt in our minds that Murray's EDB [11] medium prolongs the virulence of meningococci, though it does not maintain this quality permanently. The elaborateness of preparation and titration of this medium has prevented its becoming as popular as it deserves to be.

(b) Serum dextrose agar (medium 6) is an excellent medium for meningococci, its drawback being that such cultures are very short lived. Some laboratories transplant them every 48–72 hours, whereas others find once a week sufficiently often. Even so, many laboratories prefer to maintain their most important strains on this medium, feeling that the antigenic and immunizing properties of the strains are preserved best on it. There is very little data on the effect of frequent transplanting required by this medium upon the virulence of the strains.

(c) For longevity of cultures egg slants seem to hold first place. Such cultures, sealed, usually remain viable at 37° C. for over a year. In transplanting such cultures it is important to transfer them first to dextrose serum agar, blood agar, or egg slants, and then 48 hours later put them again on the egg slants on which they are to be stored. There seems to be considerable difference of opinion as to the effect of this medium upon virulence, antigenicity, and serological relationships.

(d) With all of the above media it is understood that incubation and storage are at 35–37° C. Although room temperatures and ordinary icebox temperatures do not permit long viability of meningococci, storage in a frozen state at —15° C. has been found to maintain glycerine covered cultures or glycerine suspensions for more than 2 years.[12] Virulence is also prolonged to some extent by this method of storage.

When agglutination is to be done to confirm the identity of the meningococcus, growth, not more than 24 hours old, from solid media is used. The favorite medium for this purpose is a 0.5 per cent dextrose agar. Growth is

suspended in 0.85 per cent sodium chloride solution of a known pH, and the suspension diluted to a density equivalent to 500 p.p.m. of the silica standards described in *Standard Methods of Water Analysis*.[13] Such a suspension contains, on an average, about 1 billion organisms per c.c., though individual suspensions vary greatly, as do individual strains.

It is important to know the pH of the salt solution used, for a culture that may be inagglutinable at pH = 7.8 may agglutinate nicely at pH = 6.8. Serum dilutions of 1–25 to 1–1,600 or higher should be made, making the final dilutions after the suspension is added 1–50 to 1–3,200. The total amount used in an ordinary sized agglutination tube is 1 c.c., though some prefer smaller tubes and lesser quantities. Normal horse serum in dilutions of 1–25 and 1–50 and a saline control should also be used. This whole test is incubated at 55° C. for 18 hours and then read. Some workers prefer incubation at 37° C. for 2 hours and storage in an icebox over night before reading.[14]

Some laboratories use microscopic slide agglutination. The greatest advantage of this procedure is that individual colonies from a primary culture may be used and a correct diagnosis arrived at quickly. The usual method for performing these is as follows [15, 16]:

Polyvalent antimeningococcic horse serum and normal horse serum are diluted 1–10 with physiological salt solution, and a loopful of each placed on a slide. Some of the suspected colony is emulsified in each, or, some of the colony is emulsified in the normal serum and some of the suspension transferred to the drop of diluted immune serum.

Agglutination may be observed macroscopically and microscopically. Organisms of characteristic morphology and staining, which are agglutinated only by the immune serum, may be tentatively considered meningococci. This method is not used for "typing."

Whether or not it is of value to "type" cultures of meningococci as a routine procedure is still an open question. As an aid in the diagnosis of meningococcus meningitis, and as a help in treatment of the individual patient, its value is uncertain at the present time, since serum used in treatment is entirely polyvalent in this country. Should the technic of preliminary "typing" by a precipitation reaction between spinal fluid and monovalent serum come into general use, it should theoretically be possible to use monovalent serum for treatment. Under these circumstances it would be important to type the meningococcus obtained from the spinal fluid as a confirmation of the precipitin test.

The British have already put these principles into use. Besides the usual polyvalent serum, they use a monovalent group I serum (including "types" I and III) for group I–III infections. For this reason the British Ministry of Health recommends routine "typing" as a guide in serum therapy as well as an index of changes in the serological type prevailing in different areas of the country. They often make use of a precipitin test upon centrifugal spinal fluid to make an early determination of the type, and confirm this later by agglutination of the culture.

Although unnecessary for diagnosis and treatment in the present state of our knowledge and experience, "typing" is of great serological and epidemiological interest, and is well worth doing from these standpoints if the laboratory has time and sera that are sufficiently specific. Information about the "types" or "groups" that are prevalent in a community or in a given epidemic can only be determined in this way.

"If "typing" is to be done, it is essential that the strains of meningococci with which the rabbits are to be immunized are chosen with great care. The serological groups are not clear-cut and almost every degree of "overlapping" can be found. The strains chosen should correspond as nearly as possible to the original type strains described by Gordon and Murray.

A satisfactory method of immunizing rabbits is by 3 courses of intravenous injections of freshly made suspension of young cultures of meningococci on 3 successive days, these series being 1 week apart. A week after the third series a trial bleeding is made, and if the serum is satisfactory the animal is bled from the heart. If the immunization extends over too long a period, the titer of the serum may be increased, but this is apt to be at the expense of specificity and more "cross agglutination" between groups is apt to result.

When strains are being "typed" it is best to include in the test the specific strains with which the sera were made and also a polyvalent horse serum of good agglutinating titer. The British Ministry of Health gets best "typing" results with the I–III group by using absorbed sera.

Blood—It is becoming more and more common to make blood cultures as an aid to diagnosis in meningococcus infections. Especially are these of value in very early cases, and in those without meningeal symptoms. These should be made as soon after the blood is drawn as possible—preferably at the bedside. Small flasks of hormone broth may be used (medium 1), *i.e.*, about 10 c.c. of blood added to 100 c.c. of warmed broth in a 250 c.c. flask. This gives a relatively large surface, which is desirable, as the meningococcus tends to grow at the surface. Semi-solid agar (medium 3) gives good results, as meningococci do not grow easily in liquid media, as a rule. Some people add the blood to hormone agar (medium 2), melted and cooled to 45° C., mix, and pour into Petri dishes. Addition of 0.1–0.2 per cent dextrose to these media may enhance the growth. When initial cultures are obtained, identification of the organism proceeds as usual.

It is with cultures isolated from blood that differentiation from the gonococcus is most often important, though this situation may also arise with cultures from spinal fluid. Definite rules for such differentiation are not easy to set down. The gonococcus is much more exacting in its growth requirements, and shows very small fine colonies on solid media. It ferments only dextrose. It is, as a rule, well agglutinated by polyvalent antimeningococcic serum, and by many of the monovalent sera, especially those of group II, so that agglutination does not make a satisfactory basis for differentiation. Some people who have worked much with gonococci feel that complement-fixation is more reliable.

Petechiae — Although meningococci are present in the petechiae, isolation from them is seldom attempted during life. Occasionally, after death, this procedure allows a diagnosis when other methods are unsuccessful, especially in fulminating cases which have died without showing meningeal symptoms and from which no blood cultures were made. The microörganisms may be seen in properly stained sections (Gram), and they may often be cultivated if the tiny bit of skin is placed in semi-solid media.

Nasopharynx—Very few hospitals and laboratories make nasopharyngeal cultures from cases of meningitis routinely. So it is difficult to know how constantly and for how long the meningococcus is found there. It can be said, however, that those who have looked for it there have frequently found it. Most often nasopharyngeal cultures are made for the purpose of

detecting carriers. In any case, the technic is the same, and is described in great detail in many manuals.

Many people like to use a West tube in making these cultures, as the swab is protected from contamination with the throat flora. Personally I much prefer a simple bent wire swab and an ordinary wooden tongue depressor. These wire swabs have been used extensively by the Army, Navy, and the U. S. Public Health Service, and are described in the pamphlet, *Standard Technique of Meningococcus Carrier Detection*, compiled jointly by them some years ago.[17] The swab is a naked flexible wire about 25 cm. long, with one end well covered by an absorbent cotton pledget, and the other end bent into a loop for a handle. The last 1–2 cm. of the cotton covered end is bent to an angle of about 30–40°.

A straight wooden swab stick is used by some, but it is less easy to obtain satisfactory material with.

In any case the swab should be passed behind the uvula and should be moved gently to and fro over the posterior and upper pharyngeal wall. It should not touch any part of the mouth or throat. A good light is important. In a search for carriers, the subject should sit facing the light. In the case of patients who are ill, a flash or head light may be used.

The blood agar plate is the medium of choice for the isolation of the meningococcus from the nasopharynx. A hormone agar with 5 per cent defibrinated rabbit's blood (medium 2) is our own choice. Dr. Rake, whose recent work with carriers has been intensive, prefers adding 4 per cent rabbits' blood to "pneumococcus agar" (medium 4). For a time laked blood agar plates were used extensively, and some people still prefer them. It has the advantage of making the meningococcus colony appear more translucent, but the disadvantage of not showing the zones of hemolysis or methemoglobin produced by many of the bacteria from which the meningococcus is to be differentiated.

In the usual blood agar plate the translucent meningococcus colonies are easily distinguished from those of the commoner inhabitants of the nasopharynx, except for the other members of the genus *Neisseria*, which are often confused with those of the meningococcus. It must not be forgotten that occasionally meningococcus colonies may be very large.

Differentiation of the meningococcus from other *Neisseria* often requires careful cultural, biochemical, and serological studies for its sure identification. This makes carrier detection a laborious procedure.

Sometimes the proportion of meningococci to other bacteria in the nasopharynx will be very small; at other times it may be found in practically pure culture.

The suspected colonies are ringed and a Gram-stained smear made from a part of each. If this smear shows Gram-negative cocci of typical morphology, the colony is picked to a blood agar or serum dextrose agar slant and incubated at 37° C. The next day cultures are made to test its fermentation reactions, it is transferred to semisolid agar to keep alive for future use, and the remainder of the 18–24 hour growth emulsified in salt solution to use for agglutination with both polyvalent and type sera. If slide agglutination is used at this stage, it should be confirmed later by the test tube method.

It is not necessary to "type" each culture for mere carrier detection, and when such a survey is being made on a large scale it is sometimes advisable, as well as necessary, to omit the "typing." But from an epidemiological point of view, "typing" is very important in carrier surveys, since it indicates the nature of the strains preva-

lent, and often also the trend of an epidemic. For this reason, it is often desirable to "type" the recovered meningococci later if there is no opportunity at the actual time of isolation. "Typing" a strain immediately after its isolation frequently gives a much better idea of its antigenic pattern, since some strains have a tendency to "spread" serologically on prolonged laboratory maintenance, so that it is more difficult later to determine its grouping accurately or its relation to the other strains in a given epidemic.

Inagglutinable strains may be encountered. If these are not true meningococci they will be apt to be agglutinated to a slight extent by normal horse serum, or they may ultimately form a yellow pigment or have peculiar fermentation reactions. If a strain is not agglutinated by normal horse serum, does not form pigment, and ferments dextrose and maltose only, it is fairly safe to consider it a meningococcus. If, however, it fails to ferment one or both of these sugars, as some strains do immediately after isolation, it is important to get serological confirmation of its identity. Sometimes a slight lowering of the pH of the salt solution used in the suspension and serum dilutions will turn the trick (in such a case controls without serum should show that it is not merely an acid agglutination). Sometimes, if a strain is plated out and several colonies picked and studied, one colony will be found to agglutinate. And sometimes an indirect method must be resorted to—a rabbit is immunized with the strain in question and the resulting serum used to agglutinate known meningococci. This last step is seldom necessary in order to get agglutination with a good polyvalent serum, but is not infrequently resorted to in "typing." Usually strains of meningococci that are peculiar in these ways become quite typical in agglutination and fermentation after a more or less long period of laboratory maintenance.

FORMULAE FOR CULTURE MEDIA

1. Beef Infusion Bouillon (National Institute of Health)

(Used as a base in making semi-solid media for stock culture maintenance, and for other media)

Constituents—

1. Beef steak (freed of fat and bone)	500 gm.
2. Peptone (1.0%)	10 gm.
3. Sodium chloride, C.P. (0.5%)	5 gm.
4. Distilled water	1,000 c.c.

Preparation—

1. Remove all fat, bone, and tendons from beef steak and chop into small pieces.
2. Add distilled water, mix well, and allow to infuse in ice chest for not less than 18 and not more than 24 hours.
3. Remove from ice chest, heat in streaming steam (100° C.) for 1 hour, then under pressure of 15 lb. for 30 minutes.
4. Squeeze through cheese cloth until 1,000 c.c. is obtained. If unable to obtain this amount, restore volume with distilled water.
5. to this broth add:

Peptone	10 gm.
Sodium chloride, C.P.	5 gm.

Mix well, stir until ingredients are dissolved.

6. Adjust reaction, using NaOH solution, to pH 7.6 or desired reaction.
7. Heat in streaming steam (100° C.) for 30 minutes.
8. Determine reaction and, if necessary, adjust to 0.2 points above desired final pH to compensate for the acid drift encountered in sterilization.
9. Filter through moist filter paper.
10. Distribute into chemically clean containers.
11. Sterilize—Steam autoclave, 15 minutes 15 lb. pressure.
12. Incubate for not less than 12 hours at a temperature of 37° C. for a check as to the efficiency of the sterlization procedure.

NOTE: Heavy precipitates of phosphates are occasionally thrown down at time of sterilization, thereby making it necessary to repeat the process of filtration and sterilization; that is, if a clear broth is desired immediately. However, if not needed for immediate use and the medium is allowed to stand for a number of weeks, the phos-

phate precipitates will dissolve, eliminating the process of filtration which extracts valuable nutritive materials.

The prolonged heating period (1 hour at 100° C. and 30 minutes at 15 lb. pressure, Step No. 3) applied to the cooking of the beef infusion, tends to stabilize the corrected reaction of the finished medium.

The color of the finished broth will vary due to the amount of blood pigment in the beef steak used. Prolonged heating and sterilization periods will also affect the color of the finished product.

Various infusion bouillons may be prepared by substituting veal, heart, liver, brain, etc., in place of the beef steak in the above formula and following precisely the same preparation procedure given for the Beef Infusion Bouillon.

2. *Nutrient Agar Agar (National Institute of Health, Washington)*

(Meat Infusion Agar)

(Used as base in making blood agar plates, semi-solid agar medium for serum-carbohydrate slants for fermentation, and for dextrose agar for shipping cultures)

Round steak, free from fat, chopped fine	500 gm.
Tap water	1,000 c.c.

Mix and let stand in icebox for not less than 18 hours and not more than 24 hours.

Heat in streaming steam (100° C.) for 1 hour and under pressure of 15 lb. for 30 minutes.

Squeeze through cheese cloth until 1,000 c.c. is obtained. If unable to obtain this amount make up loss with water.

To this broth add:

Peptone	10 gm.
Sodium chloride C.P.	5 gm.

Adjust reaction, using NaOH solution, to pH 8.0.

Heat in streaming steam for 30 minutes. To this broth add:

Shredded * agar-agar	20 gm.

* Powdered agar-agar may be used in place of the shredded agar-agar, but the following steps are required: sprinkle the powdered agar-agar on the surface of the bouillon; let stand until the agar-agar has dropped to the bottom of the container; stir briskly; then heat.

Stir thoroughly.

Heat in streaming steam for 1 hour and under pressure of 15 lb. for 30 minutes.

At this point turn out flame under autoclave. Do not open pet cocks. This will allow pressure to drop slowly. Do not open sterilizer for at least 18 hours. This will allow agar to solidify and all precipitates which have dropped to bottom of container may be cut off when the agar is slipped from the container.

The clear portion is melted and, after adjusting to pH 7.6, is filled into the desired containers and sterilized.

Sterilization: Autoclave 15 minutes 15 lb.

For blood agar plates, melt the above nutrient agar. Cool to between 42 and 45° C., add 5 per cent defibrinated rabbit's blood, mix and pour. Horse or sheep blood may be used instead of rabbit.

For semi-solid agar, see formula 3.

For serum carbohydrate slants see formula 10.

For dextrose agar slants, 1 per cent or 0.5 per cent dextrose is added to this medium. With this medium the carbohydrate may be added directly, or, even better, a 20–50 per cent solution, sterilized by heat, may be kept on hand, and enough added before dispensing to make the desired concentration.

3. *Semi-solid Agar Medium for Meningococci (National Institute of Health)*

(A modification of Hitchens's Medium)

Constituents—

1. Beef infusion bouillon (pH 7.4)	2,700 c.c.
2. Nutrient agar-agar	300 c.c.
3. Potassium chloride, KCl C.P.	0.6 gm.
4. Calcium chloride, $CaCl_2$ C.P.	0.3 gm.

Preparation—

1. Melt agar and heat bouillon to 100° C.
2. Mix agar and broth well.
3. Add potassium chloride and calcium chloride.
4. Stir until thoroughly dissolved.
5. Determine reaction and, if necessary, correct to pH 7.3.
6. Dispense into tubes.
7. Sterilize—15 minutes, 15 lb. pressure.
8. Incubate for not less than 12 hours at a temperature of 37° C. for a check as to the efficiency of the sterilization procedure.

4. *Pneumococcus Agar (Rockefeller Institute)*

Fresh beef heart (free from fat and gristle)	500 gm.
Witte peptone	10.0 gm.
Sodium chloride	5.0 gm.
Agar	20.0 gm.
Dextrose	0.3 gm.
Tap water	1,000.0 c.c.

For meningococci, 100 c.c. of citrated rabbits' blood are added to each 250 c.c. of medium, and plates poured.

5. *Semi-solid Ascitic Agar (Rockefeller Institute)*

Heart muscle (free from gristle)	1 lb.
Distilled water	1,000 c.c.
Peptone (Witte's)	10 gm.
NaCl	5 gm.
1 per cent agar	0.25 gm.

Chop meat and infuse in water over night in refrigerator. Heat infusion to 85° C. for 30 minutes. Filter through Prat-Dumas filter paper No. 50 and make up to original amount with distilled water. Add peptone and NaCl and bring to the boil. At boiling point adjust pH to 7.8 and add agar. Heat in Arnold for 1 to 1½ hours. Filter through absorbent cotton into flasks and sterilize at 116° to 118° C. for 20 minutes in the autoclave. The final pH should be 7.6 to 7.4.

To this agar, when melted and cooling, add an equal amount of sterile ascitic fluid.

6. *Glucose Semi-solid Medium (New York City Department of Health)*

Nutrient veal infusion broth	1,000 c.c.
Dextrose	1%
Agar	0.25%

Adjust reaction to pH 7.2–7.4. Tube and sterilize in Arnold apparatus for 1 hour on 2 successive days. This medium should be firm enough to hold its shape when gently inverted, should offer no resistance to the needle, and should be semi-fluid when at incubator temperature.

7. *Serum Dextrose Agar Slants (Rockefeller Institute)*

To 400 c.c. of stock 2 per cent agar add 80 c.c. of sheep serum water; sterilize in Arnold for ½ hour. Cool slightly and add 1 per cent dextrose.

Sheep serum water—1 part serum to 3 parts water which is sterilized in the Arnold for 3 consecutive days for 30 minutes. It is resterilized just before adding.

Dextrose solution—A 50 per cent solution sterilized in the Arnold for 2 consecutive days for 30 minutes.

8. *Solidified Egg Medium*

(Modified Dorsett's Egg Medium) (National Institute of Health)

Constituents—

1. Fresh eggs	4 eggs
2. NaCl solution (0.85% solution)	25 c.c.

Preparation—

1. Scrub eggs with brush in soap and water. Allow eggs to dry.
2. Place eggs in wire basket and dip into 95 per cent alcohol. Allow to remain a few seconds, after which time it is withdrawn and the small amount of alcohol which still remains on the basket and eggs is ignited in order to remove the alcohol and help sterilize the shells.
3. The shells are then broken using aseptic technic and the whites and yolks placed in a sterile container.
4. Add 25 c.c. of sterile 0.85 per cent NaCl solution.
5. Mix well with sterile beater.
6. Filter through sterile cheese cloth.
7. Dispense into sterile tubes.
8. Slant in an inspissator, heat very slowly until solidified. Do not allow heat to rise above 76° C.
9. Cool and incubate.

9. *"Chocolate" Coagulated Blood Agar (National Institute of Health)*

Constituents—

1. Sterilize veal Infusion agar (see note below)	100 c.c.
2. Fresh, sterile, defibrinated, sheep blood	10 c.c.

Preparation—

1. Melt agar (keep sterile).
2. Cool agar to 45° C.
3. Add sterile sheep blood and mix well.
4. Heat slowly in Arnold sterilizer or in a water-bath. Allow temperature to rise very slowly until medium has a very definite chocolate color. Excessive heating will cause blood to coagulate and the finished medium will show clumps of cooked blood instead of the uniform, smooth, chocolate color desired.

5. Dispense into sterile containers and allow to cool.

6. Incubate for not less than 12 hours at a temperature 37° C. for a check as to the efficiency of the sterilization procedure.

NOTE. Veal infusion agar is prepared according to the directions given for beef infusion agar substituting the same amount of veal in place of the round steak. All other ingredients remain the same and the preparation steps are to be followed exactly as listed.

10. Solid Medium for Fermentation Tests (New York State Laboratories and National Institute of Health)

Sugar-free beef-infusion agar, 2% with indicator		200 c.c.
Carbohydrate 10.0% solution	1% or	20 c.c.
Ascitic fluid	10% or	20 c.c.

Procedure—

Melt the agar and cool to 50° C.

Add carbohydrate and ascitic fluid (both previously warmed to 50° C.) .

Mix well and dispense.

Slant tubes immediately to solidify.

Incubate for 48 hours at 37° followed by 48 hours at room temperature.

Examine for contaminants.

The carbohydrate solution has been sterilized by filtrations through a sterile Berkefeld candle.

In some laboratories the serum or ascitic fluid is omitted.

11. Semi-solid Media for Fermentation Tests (National Institute of Health)

(This is usually medium 3 with indicator and 5 per cent of a filtered 20 per cent solution of the desired carbohydrate added.)

12. Enlows's Sugar Free Medium (Semi-solid) for Fermentation Tests

Peptone	5.0 gm.
Na_2HPO_4 (sodium phosphate)	7.2 gm.
KH_2PO_4 (potassium phosphate)	0.7 gm.
Agar-agar	2.0 gm.
Tap water	900.0 c.c.

The above substances are mixed well and heated for 30 minutes at 100° C. (streaming steam) and then given 15 lb. pressure for 15 minutes in the autoclave.

Filter through moist filter paper while hot. Keep solution as hot as possible during filtration process.

Three drops of concentrated brom-thymol-blue solution is added to every 500 c.c. of the clear filtered solution. The color corresponds to pH = 7.6 in the brom-thymol-blue color range.

Pour into suitable containers and sterilize 15 minutes at 15 lb. This is the basic medium.

Carbohydrate solutions are prepared as follows:

Distilled water	100 c.c.
Carbohydrate	4.5 gm.

Mix thoroughly and sterilize by filtering through a sterile Berkefeld filter.

The above solution (100 c.c.) is added to 900 c.c. of the sterile basic medium and mixed.

Dispense into sterile tubes.

Incubate 48 hours to check sterility.

13. Preparation of Concentrated Brom-Thymol-Blue Indicator (National Institute of Health)

Brom-thymol-blue (dibromo-thymol sulphonphthalein) finely pulverized	1.0 gm.
N/20 NaOH	32.0 c.c.

Grind together in a mortar until in solution.

QUANTITATIVE ESTIMATION OF SUGAR IN CEREBROSPINAL FLUID

(Kolmer and Boerner. *Approved Laboratory Technique,* 1931, p. 242)

Principle—

Proteins present are precipitated by tungstic acid and determination is carried out by the Folin-Wu method, using 1–5 dilution of filtrate.

PROCEDURE

1. With a 1 c.c. pipette transfer 1 c.c. of spinal fluid to a *clean, dry* test tube.
2. Add with a pipette 3 c.c. distilled water.
3. Using a graduated 1 c.c. pipette, add 0.5 c.c. of 10 per cent sodium tungstate.
4. Add 0.5 c.c. of ⅔ normal H_2SO_4.
5. Mix well and let stand 5 to 10 minutes.
6. Filter.
7. Pipette 2 c.c. of the clear filtrate into a Folin-Wu sugar tube and proceed as with blood. See "*Blood*" below.
8. Calculation, using standard 1:

$$\frac{20}{R} \times 50 = \text{mg. dextrose per 100 c.c. fluid.}$$

R = reading.

9. Pipette and test tubes should be abso-

lutely clean and dry or the error will be large.

10. If the cerebrospinal fluid contains a little blood, centrifuge and use the clear supernatant fluid.

For Blood—

1. Pipette 2 c.c. of tungstic acid blood filtrate into a special Folin sugar tube.
2. To a similar tube, add 2 c.c. of standard sugar solution B, and to a third add 2 c.c. of standard sugar solution C, containing 20 mg. dextrose per 100 c.c.
3. To each tube add 2 c.c. of the molybdate phosphate solution.
4. Transfer the tubes to a boiling water-bath and heat for 6 minutes.
5. Cool for 2 to 3 minutes in a cold water-bath without shaking.
6. Add to each tube 2 c.c. of the molybdate phosphate solution.
7. Let stand for 3 minutes; dilute the resulting solution to the 25 c.c. mark.
8. Insert a rubber stopper and mix.
9. Compare in a colorimeter with the nearest matching standard set at 20.

The two standards are adequate for practically all cases as they cover a range from about 70 to nearly 400 mg. of dextrose per 100 c.c. of fluid tested.

REAGENTS FOR BLOOD SUGAR DETERMINATIONS

Alkaline copper tartrate solution:

Dissolve 40 gm. of pure anhydrous sodium carbonate in about 400 c.c. of distilled water in a liter flask. Add 7.5 gm. of tartaric acid, and when this is dissolved add 4.5 gm. of crystallized copper sulphate. Mix and make up to a volume of 1 liter.

Test for the absence of cuprous copper by transferring 2 c.c. to a test tube and adding 2 c.c. of the molybdate phosphate solution; the deep blue of the copper should almost completely vanish.

If the chemicals used are not pure, a sediment of cuprous oxide may form in the course of 1 or 2 weeks. If this happens, remove the clear supernatant reagent, or filter through a good quality filter paper. Test for copper. This reagent keeps indefinitely.

Molybdate-phosphate solution:

Transfer 70 gm. of molybdic acid (C. P. Bakers analyzed "special") to a liter beaker. Add 10 gm. of sodium tungstate, 400 c.c. of 10 per cent sodium hydroxide, and 400 c.c. of distilled water. Boil vigorously for 20 to 40 minutes (to remove ammonia present in molybdic acid). Cool, and dilute to about 700 c.c. Add 250 c.c. of concentrated (85 per cent) phosphoric acid. Dilute to 1,000 c.c.

The solution should be water clear. If it has a yellow tinge the chemicals used are not pure enough and there will be an error in the determination.

Benzoic acid:

Dissolve 2.5 gm. benzoic acid in 1 liter of hot water and cool. Transfer to a bottle; the solution will keep indefinitely. Filter as necessary.

Standard sugar solutions:

A. Stock—Weigh 1 gm. of pure dextrose (glucose) on an analytical balance and dissolve in about 50 c.c. of the benzoic acid solution. This 1 per cent standard stock solution keeps indefinitely.

B. Standard containing 10 mg. dextrose per 100 c.c.—Pipette 5 c.c. of stock solution into a 500 c.c. volumetric flask and dilute to the mark with benzoic acid solution.

C. Standard C containing 20 mg. dextrose per 100 c.c.—Pipette 10 c.c. of stock solution into a 500 c.c. volumetric flask and dilute to the mark with benzoic acid solution.

Diluted standards B and C should be made fresh every month.

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SARA E. BRANHAM, *Referee*

Serological Tests for the Diagnosis of Syphilis*

THE trends indicated by the volume of specimens received for examination suggest that each year greater reliance is placed by physicians and health officials on the results of serological tests as an aid in the diagnosis and as a guide for the treatment of syphilis. The value of the procedures at present in general use in North America is thus emphasized. This situation, however, should not inhibit efforts toward further improvement. A still greater sensitivity is probably desirable; also simplification of procedures would, without doubt, result in a much wider application of such tests.

The data obtained in the study of serological tests for syphilis conducted under the auspices of the U. S. Public Health Service [1] are in general accord with the results of the investigation of the problem undertaken for the Committee on Standard Methods of the Laboratory Section of the American Public Health Association.[2] In both instances, the findings suggest that the complement-fixation test can, with safety, be made somewhat more sensitive than precipitation tests; also that these two types of procedures as developed in the United States and Canada differ in relative efficiency from those represented at the conferences at Copenhagen [3] and Montevideo,[4] sponsored by the League of Nations, where the results indicated that the complement-fixation tests were less satisfactory than some of the precipitation tests with which they were compared. The reactions reported by Dr. Kahn, who participated in all of the studies, furnish an excellent basis for comparative analysis.

The findings with specimens from lepers secured in the recently completed investigation were of special interest. A thorough study of the behavior of sera from patients with this disease is indicated. The high incidence of yaws or syphilis in some of the countries where leprosy is prevalent complicates the problem.

The desirability of employing a presumptive technic for the selection of specimens which would require further study was suggested to your committee last year. A similar recommendation was included in the report of the committee acting for the U. S. Public Health Service.[1] Such a procedure would not only facilitate the work, but also encourage a more careful study of the specimens selected for evaluation. A presumptive complement-fixation procedure with a sensitive cholesterolized antigen, less than two units of complement, and fixation over a prolonged period at from 3 to 6° C., followed by incubation at 37° C., should provide an adequate means for detecting specimens which would fail to react in completely controlled tests with such antigens. The use of a relatively small amount of complement should result in reactions being indicated even with specimens which give more marked fixation with small rather

* Report of the Referee on Methods for the Serological Diagnosis of Syphilis for the Standard Methods Committee on Diagnostic Procedures and Reagents.

than large amounts of serum. With the majority of specimens from patients with syphilis, more sensitive reactions have been obtained with cholesterolized antigens than with non-cholesterolized. Specimens which react with the non-cholesterolized antigen only are encountered so rarely that the adoption of a procedure for their detection would seem unnecessary. In a presumptive procedure, controls for anticomplementary properties would not be required since any specimen with which evidence of a significant degree of fixation occurred would be carefully tested.

The use of an oversensitive precipitation test should, in a similar manner, permit the selection of sera that would fail to react in more delicately adjusted tests of this type.

In many laboratories, entirely negative findings are obtained with at least 75 per cent of the specimens received, and 25 per cent of them, or less, either give reactions of varying degrees or are anticomplementary, or for some other reason are not satisfactory for the test. A presumptive procedure should, of course, be oversensitive, but should be so adjusted that under the conditions just mentioned approximately 70 per cent could be promptly excluded as failing to react. The remaining 30 per cent could then be studied fully. The saving of time and materials that would result might be illustrated by a concrete example. With 400 specimens per day, preliminary complement-fixation and precipitation procedures which would employ one tube each (without controls) would require 800 tubes. If negative findings were obtained with 70 per cent of the specimens, reports could be sent promptly on 280 of them. Assuming 8 tubes would be used for fully controlled complement-fixation and precipitation tests on the remaining 120 specimens, 960 additional tubes would be needed or a total of 1,760 tubes, while if a complete test with 8 tubes had been employed on the original 400 specimens, 3,200 tubes would have been required. As an increasingly large proportion of specimens is collected from persons undergoing physical examinations, those admitted to hospitals, and similar groups where the percentage of reacting sera is found to be small, the greater will be the saving in time and materials if a presumptive method is used.

Having the preliminary procedures as well as the final tests handled independently by two groups of workers would furnish protection against technical inaccuracies.

The use of presumptive tests may be inhibited through a fear of obtaining oversensitive results. Preliminary procedures without controls would not have this disadvantage, since diagnostic significance would be attached only to negative findings secured by this means.

By reducing the work with specimens which fail to react, quantitative procedures might be employed with some of the other sera, especially those which give partial or atypical reactions; for example, those which have been found to give reactions with one antigen only or at one temperature only. Careful studies of such specimens might be helpful, particularly in instances where the patients are not found to have a definite history or definite clinical manifestations of syphilis. A means for the evaluation of the relative specificity of the fixation obtained would be especially desirable in such cases. The procedure described by Wadsworth, Maltaner, and Maltaner,[5, 6] provided the technic could be made applicable for complement-fixation tests for syphilis in which small amounts of serum are used, may furnish a method for determining the significance of reactions of the type mentioned, as well as those secured with specimens from lepers and the ones occasionally ob-

tained with blood from patients having malaria, tuberculosis, and other febrile diseases.

Preliminary findings indicate that presumptive procedures of the type outlined would markedly facilitate the work of a routine nature without jeopardizing accuracy. Also, the comparatively small percentage of specimens with which partial reactions are obtained should permit them to be studied fully, thus facilitating the wider use of the test, in view of the greater economy, and also providing additional information in regard to reactions of the type which, under present conditions, sometimes offer particular difficulties of interpretation.

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RUTH GILBERT, *Referee*

Tentative Methods for the Cultivation and Isolation of Tubercle Bacilli and the Production of Tuberculin*

I. General statement
II. Preparation of specimen for examination
III. Preparation of reagents
IV. Preparation of culture media
V. Production of tuberculin (Koch's A.T.)

Cultural Method for the Primary Isolation of M. Tuberculosis

The cultural method for the isolation of *M. tuberculosis* has now gained wide recognition. It has been found to be quite as reliable in most instances as the method of guinea pig inoculation and has the advantage of being more economical and time saving. Guinea pig inoculation should be carried out on specimens of urine.

Method of Procedure—One of the most important steps in the preparation of routine specimens for the culture of tubercle bacilli is the method of treating the specimen in order to eliminate the contaminating organisms, which would hinder or obscure the growth of the tubercle bacillus. It is also essential that whatever form of treatment is instituted, it should not kill any tubercle bacilli present in the specimen.

1. The specimen as received is placed in a sterile 6" test tube, care being taken to deliver it to the bottom of the tube. This is done to prevent, as far as possible, contaminating the side of the tube. The tube is well flamed and a sterile cotton plug is inserted.

2. Equal parts of 3 per cent hydrochloric acid containing bromcresol purple is added to the specimen. Should there only be a sedimented specimen, 5 c.c. of this reagent is added. This acid solution is 3 per cent of the concentrated hydrochloric acid, and is not 3 per cent hydrogen chloride.

3. After the addition of the 3 per cent hydrochloric acid solution to the specimen, the tube is shaken by a side to side motion and the upper portion of the tube is well flamed to within an inch of the upper level of the liquid. A fresh sterile cotton plug is inserted in the tube.

4. The partially treated specimen is left at room temperature for 2 hours, after which time it is neutralized by the addition of 3 per cent sodium hydroxide to pH 7.0. This reagent is added aseptically to the tube.

5. A rubber cap is placed over the tube, in order that the overlapping cotton plug will be held in place. The neutralized specimens are then centrifuged at high speed for ½ hour.

6. After centrifugalization, the supernatant fluid, to within ½" from the top of the sediment, is withdrawn by means of a suction apparatus, which is attached to a rubber tubing to a flask containing phenol.

7. By means of a platinum loop, a beef infusion broth culture is planted with a loopful of material from each specimen. These broth cultures are incubated at 37° C. for 24 hours, and then examined for turbidity in the liquid.

8. These broth cultures indicate whether or not all extraneous organisms have been destroyed in the treatment process.

9. All the specimens showing no growth on the broth are then planted by a sterile capillary pipette on various types of media suitable for growing the tubercle bacillus.

10. After planting, the upper portion of the culture tube is flamed, the cotton plug is ignited, and inserted in the tube. A rubber cap (previously boiled for 15 minutes) is placed over the end of the tube.

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* Report of the Referee and Associate for Tuberculosis and the Tubercle Bacillus for the Standard Methods Committee on Diagnostic Procedures and Reagents.

11. The specimen is incubated for 8 weeks at 37° C. The cultures are examined at the end of 4 weeks for visible growth. Cultures showing visible growth at this time are examined and reported. Cultures showing no growth after 4 weeks' incubation are reincubated for a further 4 weeks.

12. Many types of culture media have been used and the following have been found satisfactory: Lowenstein's, Petragnani's, Woolley's medium with and without glycerine, and modified Petroff's medium. Lowenstein's medium has been found to support growth the best.

Preparation Reagents—The reagents used for the treatment of these specimens, 3 per cent hydrochloric acid solution and the 3 per cent sodium hydroxide solution are sterilized by autoclaving 20 minutes at 15 lb. pressure; 0.08 gm. of the indicator bromcresol purple is added to the hydrochloric acid solution before sterilization. These reagents are then placed in a glass cabinet to exclude air-borne contaminants. A siphon apparatus with a bottle attached is placed in each flask. When not in use the glass case is kept closed.

MEDIA

Lowenstein's Culture Medium

Ann. de l'Inst. Pasteur, 50:161–166 (Feb. 13), 1933. See also *Tubercle,* IV:502–504 (Aug.), 1933.

1. 20 eggs carefully cleansed by immersion for ½ hour in tepid soapy water to which is added 5 per cent sodium carbonate
2. Asparagin solution: Asparagin (Merck) grammes 3; K_2HPO_4 (potassium phosphate, Merck) 1 gm.; Pure crystalline magnesium sulphate (Kahlbaum) 1 gm.; Pure glycerin 30 B. (Kahlbaum) 60 c.c.; Distilled water 1,000 c.c. This solution is sterilized for 2 hours in flowing steam. It is very stable.
3. Potato starch
4. Congo red (Grubler) 2 per cent aqueous solution sterilized in autoclave for 15 minutes
5. Malachite green (Grubler) 2 per cent aqueous solution sterilized in flowing steam for 2 hours

To 600 c.c. of the asparagin solution one adds 10 c.c. of a 50 per cent solution of potato starch and 60 c.c. of juice pressed from sterile tomatoes. This mixture is boiled for 2 hours in a water-bath. After cooling to 50° C., 16 eggs are added and then the yolk of 4 eggs. Then this mixture is actively stirred and 20 c.c. of Congo red solution is added.

After stirring, it is filtered through 4 layers of gauze. Then it is put in sterile tubes. Coagulation is produced by heating to 75–80° C. in flowing vapor. The tubes are carried to the oven and the next day it is again heated for 2 hours at 75–80° C. To cap the tubes use cellulose.

The culture media should be prepared oftener than every 2 weeks and kept in the dark.

Lowenstein's Media as Used in Studies Carried Out in the Ontario Department of Health:

Asparagin solution	1,000 c.c.
Potato flour	8.3 gm.
Tomato juice	100 c.c.

Boil in double boiler for 2 hours, cool to 45° C., and add:

Whole eggs	26
Egg yolks	8
2 per cent malachite green	34 c.c.

Strain through gauze, tube and sterilize.

Lowenstein's Medium with two dyes and sodium silicate is made as above, but with the addition of 34 c.c. 2 per cent Congo red solution and 0.5 c.c. of 1.9 per cent sodium meta silicate 9 H_2O per 100 c.c. of medium. This gives approximately 2 mg. SiO_2 per 100 c.c.

In making the asparagin solution, chemicals of any standard C.P. brand are used.

Tuberculosis Culture Media

Coagulated egg is the basis of many tuberculosis culture media. The coagulation and sterilization of these media cause considerable trouble. The following procedure is recommended:

The tubes of media in slant racks are placed in a cold autoclave. The racks are covered with newspapers to prevent too sudden contact with the steam. The autoclave is closed and the air outlet valve also closed. Pressure is raised to 15 lb. without letting the air escape. This condition is maintained for 10 minutes. The air outlet valve is then slightly opened (the pressure should not be allowed to vary more than ½ lb.), and the condensed water and some air are allowed to escape. All the air should not be allowed to escape. The valve is then closed and sterilization continued for 15 minutes.

Petroff's Medium

J. Exper. Med., 21:38–42 (Jan.), 1915.

Two parts of egg (white and yolk)
One part of meat juice
Gentian violet sufficient to the proportion of 1 to 10,000

Meat juice: 500 gm. of beef or veal are infused in 500 c.c. of a 15 per cent solution of glycerin in water. Twenty-four hours later the meat is squeezed in a sterile meat press and collected in a sterile beaker.

Eggs: Sterilize the shells of the eggs by immersion for 10 minutes in 70 per cent alcohol or by pouring hot water upon them. Break the eggs into a sterile beaker and, after mixing the eggs well, filter through sterile gauze. Add 1 part by volume of meat juice.

Gentian violet: Add sufficient 1 per cent alcoholic gentian violet to make a dilution of 1 to 10,000.

Tube about 3 c.c. in each sterile test tube and inspissate for 3 successive days: on the first day at 85° C., until all the medium is solidified, changing the places of the tubes if necessary; on the second and third days for not more than 1 hour at 75° C. For the bovine type omit the glycerin and infuse the meat for 24 hours in water. Bovine tubercle bacilli grow in this medium even if it contains glycerin, but on account of the popular belief and the lack of data we used a medium without the glycerin.

The following modification is used in the Laboratories of the Ontario Department of Health:

Milk	200 c.c.
Nutrient broth (not adjusted)	200 c.c.
Eggs	800 c.c.
Glycerin	60 c.c.
Malachite green 2 per cent (aqueous)	60 c.c.

NOTE: Nutrient broth—0.3 per cent beef extract, 0.5 per cent P.D. Peptone, 0.5 per cent sod. chloride

Mix well, stain through gauze, tube, slant and sterilize.

Herrold's Media as Modified by Feldman

J. Infect. Dis., 48:236, 1931.

Beef Extract Agar

Liebig's beef extract	3 gm.
Peptone	10 gm.
Sodium chloride	5 gm.
Agar	15 gm.
Distilled water	1,000 c.c.

Adjust media to pH 7.5.

Autoclave 15 minutes at 15 lb. pressure.

To each 150 c.c. of melted agar add the yolk of one egg, when temperature of agar is 60° C.

Allow agar egg yolk mixture to cool to 40° C., then dispense in tubes.

NOTE: Sterilize egg shell by immersion in phenol, or flame one end of the shell. By means of a pair of flamed forceps, make an opening. Allow the egg white to escape, then by means of a sterile pin or needle, puncture the yolk, allowing the yolk to mix with beef extract agar.

Potato Egg Medium for the Isolation of Tubercle Bacilli

J. S. Woolley and F. G. Petrik, *Am. Rev. Tuberc.*, Nov., 1931, pp. 596–603.

Autoclave medium sized unpeeled potatoes for 30 minutes at 15 lb. pressure. Peel and, after thorough mashing, suspend in 15 per cent glycerol-water, in the proportion of 500 gm. of original potato to 500 c.c. of 15 per cent glycerin. Heat in a boiling water-bath for 30 minutes, stirring occasionally. Strain through two layers of surgical gauze by compression into a flask and then boil filtrate for about 5 minutes. Cool and add 1 part of filtrate to 2 parts of well beaten whole fresh egg. Add sufficient 1 per cent crystal violet to make a concentration of 1 to 30,000. Stir thoroughly, to distribute the dye evenly throughout the mixture. Pour the mixture through one layer of sterile gauze into a tubing funnel and add approximately 7–8 c.c. of medium to each tube. Sterilize in the inspissator at the proper slant for ½ hr. at 85° C. on the first day, and at 75° C. on the second day.

Bring inspissator up to required temperature before introducing tubes. By omitting the crystal-violet an excellent medium is obtained for growing stock cultures of tubercle bacilli. Incubate the tubes to test for sterility. Tubes must be stored, seeded, and incubated in an upright position to keep the surface of the medium dry.

Modification used in the Laboratories of the Ontario Health Department:

Potato	1,000 c.c.
Water (no glycerin is used)	1,000 c.c.
Monobasic potass. phosphate	14 gm.

Filtrate from above..........	900 c.c.
Malachite green 2 per cent sol.	34 c.c.
Crystal violet 1 per cent sol.	6.5 c.c.

Petragnani's Medium

C. F. Cerruti, *Brit. J. Trop. Med. & Hyg.*, May, 1932, pp. 157–158.

Preparation of Medium

Milk	160 c.c.
Granular Potato starch (Fecula)	6 gm.
Peptone	1 gm.

Place these ingredients in a liter flask with pieces of a peeled potato the size of a hen's egg. Take the flask by the neck and put it in boiling water, shaking vigorously. When it has formed a colloid dough, stop shaking and leave in the boiling water-bath for 1 hour. Take it out and leave until the temperature is down to 60° C. Add 4 whole eggs and 1 yolk.

It is not necessary to sterilize the flask or milk, or to treat the eggshells. Now add:

Glycerin	12 c.c.
Malachite green 2 per cent aqueous solution	10 c.c.

Stir until it becomes a homogeneous mass and filter the mass through sterile gauze into a sterile flask; fill into sterile tubes (20 cm. by 22 mm.), or plates, using 12 c.c. to 15 c.c. of medium for each. Solidify in an inspissator in the following manner: Place the tubes or plates in the inspissator when it is still cold, bring it slowly to a temperature of 85° C., keep it at this temperature for 25 to 30 minutes, and leave to cool. This treatment is usually sufficient to solidify and to sterilize the medium, but its nutritive properties are not damaged by a tyndallization of 15 minutes at 80° C. the first day, and 10 minutes at 75° C. for two successive days.

The bovine strain will not grow well in the presence of glycerin, and when the material is suspected of containing a bovine strain two sets of cultures should be made, one with Petragnani's usual medium and one without glycerin, using bovine bile instead.

Modification used in the Laboratories of the Ontario Department of Health:

900 c.c. milk
36 gm. potato flour
6 gm. Peptone
6 pieces of potato (size of an egg)
24 eggs
6 egg yolks
72 c.c. glycerine
60 c.c. 2 per cent aqueous malachite green

Cut the potatoes into thin slices. Add milk, potato flour, and peptone. Cook in a double boiler for 2 hours, stirring until the mixture becomes sticky, then stir occasionally. Break the eggs and egg yolks into a 2 liter flask; shake well. Add the glycerine and malachite green and shake. Cool the potato milk mixture to 45°–50° C. Add egg glycerin mixture to the cooled potato mixture and mix well. Filter through gauze, tube and sterilize.

Egg Yolk for Growth of Tubercle Bacilli

Herrold. *J. Infect. Dis.*, 48:236. *Medium* is as follows:

Beef extract agar prepared as follows:

Liebig's beef extract............	3 gm.
Peptone	10 gm.
NaCl (mixture adjusted to pH 7.5)	5 gm.
Agar	10 gm.
Distilled water	1,000 c.c.

The yolk of 1 egg is added to 150 c.c. of melted agar at a temperature of 60° C. This is approximately 15 per cent of egg yolk. The agar is allowed to cool to about 40° C. and dispensed in tubes. A simple method of adding egg yolk is to flame one end of the egg and crack it with sterile forceps, so that a small opening is made in the shell for discarding the white, after which the yolk is broken with a sterile platinum loop to permit its flow into the container of melted agar. The egg may be immersed in phenol and then alcohol before flaming, or it may be placed in boiling water for 1 minute after preliminary flaming. The incubator should be kept moist to prevent drying of the plates, although it has been noticed that the yolk agar plates do not dry so quickly as blood agar plates. Closed containers may be used when the incubator is not sufficiently moist, or the plates may be wrapped with tin foil.

PREPARATION OF TUBERCULIN (KOCH'S A.T.)

Medium—

Asparagin (Pfanstiehl)	5.0 gm.
Ferric amm. citrate (Bakers)..	0.05 gm.
Mag. sulphate (Bakers)........	1.0 gm.
Pot. acid phosphate (Bakers)..	3.0 gm.
Amm. citrate (Bakers)........	5.0 gm.
Sodium chloride (Merck)......	2.0 gm.
Sodium carbonate (Merck)....	1.0 gm.
Glycerol (Bakers)	50.0 c.c.
Distilled water	1,000.0 c.c.

Dispensed in 150 c.c. amounts in 1 liter flasks. Sterilized in the autoclave at 120° C. for 1 hour.

Strain—Human strain of tubercle bacillus known as "Johnston." It is of moderate virulence such that 0.5 mg. of the moist culture will cause the death of the guinea pig in 6 to 8 weeks.

Time of Incubation—A small amount of the surface growth from a previous batch is transferred to each flask and allowed to remain at 37° C. for 4 months. At the end of this time the flasks are removed from the incubator, placed in an Arnold sterilizer and kept in free-flowing steam for 1 hour. The contents of the flasks are filtered through hardened filter paper (Whatman's No. 50). The filtrate is concentrated in a water-bath at 85° to 90° C. to one-tenth of the original volume of the medium. The concentrate is centrifuged at high speed, the supernatant removed and 0.3 per cent phenol is added and stored at 5° C.

TESTS FOR NONSPECIFIC TOXICITY, STERILITY AND STANDARDIZATION

Nonspecific Toxicity Test — Five c.c. are injected subcutaneously into a normal guinea pig and observed for 3 months, at the end of which time a complete autopsy is performed.

Sterility Test—Samples are taken from each container and tests made in fluid media according to the standards for sterility testing.

Standardization—A sample of the International Standard Old Tuberculin is received every 6 months from the Permanent Commission on Biological Standardization of the League of Nations, as distributed from Hampstead, London, and is used as the standard.

TEST FOR POTENCY

The Intradermal Test in guinea pigs is the method used for standardization. Six white guinea pigs of approximately 300 gm. are sensitized with human tubercle bacilli receiving 0.5 mg. of moist culture. Four weeks after the injection of the tubercle bacilli the hair is removed from the backs of the guinea pigs by using a fine electric clipper. The backs are then marked off into areas by means of an indelible pencil.

The following dilutions are made of (a) the Test Tuberculin and (b) the Standard Tuberculin: 1 in 500; 1 in 1,000; 1 in 2,000; 1 in 4,000. Each guinea pig is inoculated intradermally with 0.1 c.c. of each dilution of the two tuberculins; the dilutions of the Test Tuberculin along one flank and those of the Standard Tuberculin in corresponding sites of the opposite flanks. The reactions are read in approximately 24 hours after the injections and comparison made of the two tuberculins.

INTRADERMAL TESTS IN THE HUMAN OR THE MANTOUX TEST

The initial dose should be 0.01 mg. contained in 0.1 c.c. If negative the test should be repeated using 1.0 mg. in 0.1 c.c.

A. L. MACNABB, *Referee*
M. H. BROWN, *Associate Referee*

Tentative Methods for the Recognition of the Brucella Group of Organisms and Other Biological Procedures as They Relate to the Diagnosis of Undulant Fever*

Isolation Procedures

BLOOD CULTURE

Citrated Blood[1]—Receive blood in sterile rubber stoppered culture tube containing sufficient dry sterile sodium citrate to give a final concentration of 1 per cent per 10 c.c. A 10 c.c. sample is sufficient for culture. A 1 per cent concentration of sodium citrate will prevent phagocytosis of any organisms present in the blood.

Incubate the citrated blood sample in 10 per cent carbon dioxide at 37° C. Draw off a 0.3 c.c. sample every 3 days and run over the surface of a liver infusion agar slant. Reincubate the blood sample and examine all slants carefully for growth at the 3 day intervals. If the slants show the presence of contaminants, add all further samples of blood to liver infusion slants containing gentian violet in a 1:200,000 concentration. Make smears from suspicious slants and examine for Gram-negative cocco-bacilli. Continue this procedure until the specimen is used up or until a suspicious organism has been isolated. Isolate suspicious Gram-negative cocco-bacilli in pure culture on liver agar plates plus gentian violet and identify by agglutination, hydrogen sulphide production, and dye tests.

Maintain pure cultures of *B. melitensis* and *B. suis* on liver infusion slants in air and pure cultures of *B. abortus* on the same medium in 10 per cent carbon dioxide until they will grow in air.

Inactivated Blood[2]—The blood sample should be inactivated for 30 minutes at 55° C. immediately after it has been removed from the patient. Place the

* Report of the Referee on Serological, Bacteriological, and Other Biological Procedures in the Diagnosis of Undulant Fever, for the Standard Methods Committee on Diagnostic Procedures and Reagents.

sample in a flask containing 50 c.c. of liver infusion broth and incubate in 10 per cent carbon dioxide at 37° C. Observe at 3 day intervals, and run 0.3 c.c. sample over the surface of a liver infusion slant when the first sign of turbidity appears. Then follow the procedure as outlined under Citrated Blood. Incubate the blood sample at least 1 month.

URINE [1]

Centrifuge a 50 c.c. sample of urine at 3,000 r.p.m. for 1 hour. Spread the sediment over the surface of two liver infusion agar plates containing gentian violet in a 1:200,000 dilution. Incubate the plates in 10 per cent carbon dioxide at 37° C. for 72 hours and examine. Brucella colonies appear light blue violet in color on gentian violet plates. Transfer suspicious colonies to a second gentian violet plate if contaminants are present or to plain liver infusion agar if they are not. Identify the organism by agglutination, by hydrogen sulphide production, and by dye tests. Aerobic types of Brucella will not be inhibited in 10 per cent carbon dioxide.

FECES [3]

Mix 1 gm. of feces in 50 c.c. of sterile physiological salt solution and shake to obtain a thorough suspension. Filter the suspension through four layers of hospital gauze to remove gross particles. Centrifuge at 500 r.p.m. for 3 minutes to throw down other particles and other bacteria. Remove the supernatant suspension to another tube, and add sufficient agglutinating serum to make a dilution of 1:100. Shake and place the tube in a 37° C. water-bath for 2 hours. Centrifuge at 500 r.p.m. for 5 minutes and discard the supernatant. Resuspend the precipitate in physiological salt solution, shake and recentrifuge. Discard supernatant fluid. Repeat this procedure twice. Spread the precipitate over the surface of two eosin methylene-blue agar plates containing a 1:200,000 concentration of gentian violet. Incubate in 10 per cent carbon dioxide at 37° C. for 72 hours. Transfer suspicious colonies to a second gential violet plate if contaminants are present or to liver infusion agar plates if they are not. Identify the organism by agglutination, by hydrogen sulphide production and by dye tests. Aerobic types of Brucella will not be inhibited in 10 per cent carbon dioxide.

MILK

See *Standard Methods of Milk Analysis* for this procedure.

GUINEA PIG INOCULATION [1]

Guinea pigs are inoculated with, (1) blood, (2) urine sediment, and (3) milk.

Blood—Inoculate one guinea pig subcutaneously with 2 c.c. of blood from specimen received for culture. At the end of 8 weeks, anesthetize the animal and withdraw sufficient blood for an agglutination test. Kill the animal and culture the spleen pulp, heart's blood, urine, and bile on liver infusion agar. Make duplicate plates for each specimen. Incubate one set in 10 per cent carbon dioxide and the other in air at 37° C. Observe the plates at 3 day intervals for suspicious colonies. Make smears and examine for Gram-negative cocco-bacilli. Identify as indicated under Identification Procedure.

Urine — Centrifuge uncatheterized specimens of urine and follow the procedure for Blood. Inject animals with 2 c.c. specimens of catheterized urine.

Milk—See *Standard Methods of Milk Analysis* for this procedure.

BLOOD SERUM AGGLUTINATION TEST
With Unknown Serum
TEST TUBE METHOD [1]

Preparation of Antigen—Prepare a monovalent antigen with a type strain of *B. abortus*. Inoculate liver infusion agar Blake bottles with saline suspensions of 72 hour liver infusion agar cul-

tures of the organism. Incubate the Blake bottles in air at 37° C. for 72 hours. Remove the growth from the agar surface with a solution of 0.5 per cent phenol in 0.85 per cent salt solution. Make smears to determine purity of suspensions. Filter suspensions through several layers of hospital gauze to remove particles of agar. Unheated antigens are satisfactory and are recommended. Store the concentrated antigen until ready for use. For routine tests, dilute the antigen concentrate with phenolized salt solution to a turbidity 7 cm. Gates. Diluted antigen will remain satisfactory at room or coldroom temperature for 1 year. Check the antigen with known antisera of high, medium and negative titer.

The test—Bring samples and antigen to room temperature. Prepare serum dilutions on the multiple or decimal system. Add antigen and shake tubes to mix serum and antigen. Incubate in a water-bath at 55° C. for 4 hours and hold at room temperature or in the coldroom over night before reading. Record complete agglutination by a plus sign (+), incomplete agglutination with a plus-minus sign (±) and negative agglutination with a negative sign (—).

RAPID METHOD [1]

Antigen dropper pipette—Prepare capillary pipettes by drawing out glass tubing ⅛" inside diameter. Cut the capillary end at a diameter 0.07". Do not flame delivery end of pipette. This pipette should deliver 0.03 c.c. antigen in each drop.

Glass plate and darkfield illumination box—Rule of a 6½" x 14" piece of double thickness window glass in 1" squares with a diamond point pencil. Set the glass on the top of a box 12" long x 10" wide x 6" deep with one side of the top covered to a width of 3½". Place a light bulb under the covered portion of the top to provide direct illumination. Paint the inside of the box directly behind and above the light white and the remainder black.

Serum amounts—Use 0.08, 0.04, 0.02, 0.01 and 0.004 c.c. of serum in the test. These volumes, when added to 2 c.c. of antigen in the tube test give final dilutions of 1–25, 1–50, 1–100, 1–200 and 1–500.

Preparation of Antigen—See "Brucella Infections in Animals and Man," by I. Forest Huddleson, for detailed procedures for the preparation and standardization of rapid antigen.

The test—Bring samples of serum and antigen to room temperature. Shake antigen thoroughly and at 2 hour intervals during sample testing. Test 6 sera at one time; 0.08, 0.04, 0.02, 0.01 and 0.004 c.c. amounts of each serum to be tested in each row marking from the bottom to the top of the row. Place a drop of antigen on each drop of serum. Hold the pipette vertical so that the volume of the drop delivered will be correct. Mix the serum and antigen for each serum with a fresh toothpick working from the bottom to the top of each row. Lift the plate and tilt back and forth for 2–3 minutes. Place plate back on box, turn on light, and read results. Results may be read in serum amounts or serum dilutions. Turn off light as soon as results are read. Scrub the plate with washing powder, rinse in tap and distilled water and wipe dry with a clean chamois skin.

With Unknown Organism

TEST TUBE METHOD

Use the same procedure for agglutination as outlined under Agglutination Test, with unknown serum. Use an abortus antiserum [4] prepared as follows: Prepare antisera in rabbits. Dilute a suspension of an avirulent strain of *B. abortus* to a turbidity of 7 cm. with the Gates apparatus. Kill the suspension by heating for 1 hour at 56° C. Inject 1 c.c. of suspension subcutaneously on 2 consecutive days. On the third date in-

ject 0.5 c.c. intravenously. One week from the first injection inject 1 c.c. of heated suspension intravenously. Repeat this dose for the next 2 days. One week from the fourth injection inject 1 c.c. of heated suspension intravenously. Inject the live saline suspension from one-half of a liver infusion agar slant intravenously daily for the next 2 days. Rest the animal 1 week, and inject the live saline suspension from one-half of a liver infusion agar slant intravenously. Inject the live suspension from one whole slant intravenously daily for the next 2 days. Rest the animal for one week. Inject the live suspension from one whole slant intravenously daily for 3 days. Make test bleedings to determine the titer and bleed the animal to death from the heart if the titer is satisfactory. If not, repeat the schedule of the last week until test bleedings indicate a satisfactory titer. The schedule produces an antiserum with a titer of 1 to 2,560.

MILK SERUM AGGLUTINATION TEST [5]

Let the samples of milk stand for 6 to 8 hours to allow cream to separate. Pipette off as much cream as possible and place samples in tubes. Add 2 drops of rennet to each 5 c.c. portion of milk and mix thoroughly. Incubate tubes at 37° C. in a slanting position so that the curd and serum will separate. The serum will form in about 2 hours. The samples should be placed in a cold-room for 6 to 8 hours to obtain sera free from particles of casein. Test the clear serum in the same manner as blood serum. Do not test sour milk, colostrum, or milk in which the curd has become partially digested. Samples of milk should be iced if they are to be in transit more than 10 hours.

DYE BACTERIOSTASIS [1]

Liver Infusion Agar—See preparation of medium under Determination of Hydrogen Sulphide production.

One per cent stock thionin solution, aqueous—

Use the following formula to prepare a 1.0 per cent stock solution:

a. Formula

Certified thionin $1 \times \dfrac{1}{\text{total dye content}}$

Distilled water up to 10.0 c.c.

b. Procedure

Weigh dye and add to distilled water in a culture tube. Boil for 15 minutes in a water-bath.

One per cent basic fuchsin solution—

Use the following formula to prepare a 1.0 per cent stock solution:

a. Formula

Certified basic fuchsin $1 \times \dfrac{1}{\text{total dye content}}$

Distilled water up to 10.0 c.c.

b. Procedure

Weigh dye and add to distilled water in a culture tube. Boil for 15 minutes in a water-bath.

Thionin liver infusion agar plates—Melt French squares of liver infusion agar in flowing steam or water-bath. Heat stock solution of thionin for 20 minutes in flowing steam or water-bath. Add sufficient 1.0 per cent thionin solution, *while still hot,* to each bottle of liver infusion agar to make a dye concentration of 1 to 50,000. Whirl bottles to mix thoroughly and pour into sterile Petri dishes.

Fuchsin liver infusion agar plates—Melt French squares of liver infusion agar in flowing steam or water-bath. Heat stock solution of basic fuchsin for 20 minutes in flowing steam or water-bath. Add sufficient 1.0 per cent basic fuchsin solution, *while still hot,* to each bottle of liver infusion agar to make a dye concentration of 1 to 25,000. Whirl bottles to mix thoroughly and pour into sterile Petri dishes.

The test—Divide each thionin plate into equal segments. Divide each fuchsin plate into equal segments. Spread a heavy loopful of each culture over one

segment of one thionin and one fuchsin plate. Incubate plates for 72 hours at 37° C. and record presence or absence of growth as indicated below under Recording. Care should be taken not to confuse a heavy inoculum for growth.

Recording—Indicate results according to the following key:

Growth	*Symbol*
Present	+
Absent	—

Classification—Classify the strain according to the following key:

Growth		
Thionin	*Basic Fuchsin*	*Classification*
+	+	*B. melitensis*
—	+	*B. abortus*
+	—	*B. suis*

HYDROGEN SULPHIDE PRODUCTION [1]

Lead acetate paper—Prepare strips of lead acetate paper as follows: Dissolve 10 gm. of lead acetate normal, C.P. grade, in 50 c.c. of boiling distilled water. Immerse sheets of filter paper in the acetate solution until saturated. Dry paper in incubator at 37° C. Cut paper in strips measuring 2½" x ¼". Store in stoppered bottles.

Liver infusion agar—Prepare liver infusion agar slants according to the following formula:

a. Formula

Agar, Bacto	20 gm.
Tap water	500 c.c.
Liver infusion	500 c.c.
Peptone, Bacto	10 gm.
Sodium chloride, C.P......	5 gm.

b. Procedure

Grind fresh, fat-free beef liver to a plastic mass. Mix 1 lb. of ground liver with 500 c.c. of tap water. Cover the container and place in flowing steam for 20 minutes. Remove cover and stir to mix thoroughly. Continue heating for 1½ hours. Filter through 30 mesh wire screen. Add ingredients in above formula to 500 c.c. of liver infusion. Steam for 1 hour. Cool to 60° C. and adjust to pH 7.0. Steam for ½ hour. Decant and tube in 5 x ¾" tubes. Autoclave tubes for 25 minutes at 121° C. The pH should drop to 6.6 during sterilization.

c. Checks

Incubate for 48 hours at 37° C. to check sterility.

The test—Inoculate a liver infusion agar slant with a large loopful of each culture to be tested. Insert a strip of lead acetate paper between the cotton plug and tube wall so that the strip projects 1" below the bottom of the cotton plug. Incubate at 37° C. for 24 hours. Record the absence or presence of blackening on the lead acetate paper as indicated below under Recording. Remove the strip of lead acetate paper and insert a fresh strip. Save each lead acetate paper so that final interpretation may be made from the four papers for each strain. Incubate at 37° C. for 24 hours and record results. Repeat this procedure until the production of hydrogen sulphide has been observed for 4 successive days.

Recording — Record results under "H_2S Production" of report form. Record the H_2S production for the first 24 hours under 1, for the second 24 hours under 2, and so on. Record results according to the following key:

H_2S Production	*Symbol*
None	—
Trace	Tr.
Moderate to marked.....	+

Classification—

Classify each strain according to the following key:

H_2S Production	*Classification*
None or trace for 4 days..	*B. melitensis*
Moderate to marked for the first 2 days........	*B. abortus*
Moderate to marked for 4 days	*B. suis*

BRUCELLA NUCLEOPROTEIN INTRADERMAL TEST—HUDDLESON [1]

Preparation—Grow a smooth strain of *Br. abortus* separately for 72 hours at

37° C. on liver infusion agar in monel metal trays 6" wide, 10" long and ½" deep. The tops of the trays are fitted with a cover of the same metal, but slightly larger in size. At the end of the incubation period lift the growth from the surface of the medium with a celluloid spatula and suspend in a large volume of distilled water. Recover the cells immediately in a Sharples laboratory centrifuge and dry in vacuum over H_2SO_4 at 37° C. The procedure used in obtaining the nucleoprotein fraction from the dried cells was chosen for the purpose of preventing as far as possible chemical alteration of the protein. Carry the separation out rapidly at 5° C. and with suitable precautions to prevent enzymatic decomposition.

Grind a 100 gm. portion of the dried cells in a ball mill to a fine white powder and extract at room temperature for two 5 day periods each with 500 c.c. of anhydrous ether. Decant the solvent and collect the residue on a Buchner funnel and wash with ether. Transfer the air-dried residue from the ether extraction to a small porcelain ball mill together with 200 gm. of cracked ice made from distilled water, and rotate the mill for 2 hours. During the period of rotation add another 100 gm. of ice to maintain a low temperature. At the end of the rotation period add 300 gm. of cold water and allow the mill to stand for 5 hours in the icebox. Shake occasionally by hand. Decant the contents of the mill, the stiff foam being cut with ether. Grind the remaining residue in the mill for another hour with 200 gm. of cracked ice and water and wash from the mill with cold water.

Make the total combined volume of the extracts from the mill to 2 liters. Pass the combined extracts through a Sharples centrifuge several times to separate the cellular material. The final liquid should be clear and slightly yellow. Precipitate the clear extract at a pH of 3 by the addition of 1:1 acetic acid. Allow precipitation to continue for 24 hours in the cold. Separate the precipitate from the supernatant liquid by decantation and centrifuging. Suspend in cold water by drawing it through a fine cloth by suction. Stir the suspended material mechanically and cool with ice while N1 NaOH is added from a burette to alkalinize and effect solution. Keep the pH below 11. Precipitate the solution with 1:1 acetic acid and redissolve in slightly alkaline water three times. Reprecipitate the alkaline solution with 1:1 acetic acid; wash the precipitate twice with distilled water and then dehydrate first with alcohol, then with acetone and ether. Dry the grayish white residue in vacuum over sulphuric acid. Solution of the dried residue is effected in physiological salt solution brought to a pH of 7.4 with N1 NaOH. Sterilize the solution by passing through a sterile Berkefeld W candle. The recovered filtrate is clear and colorless. It is now ready for standardization based on total nitrogen content. The sterile recovered liquid should be diluted with sterile physiological salt solution so that 0.1 c.c. (one skin test dose) contains approximately 0.000015 gm. of nitrogen. It may be placed in sterile vials and sealed until ready for use. The diluted nucleoprotein fraction appears to retain its potency for an indefinite period.

Technic and Interpretation—Make the test by injecting 0.1 c.c. of the fluid intracutaneously in the lateral surface of the forearm, using a 26 gauge needle. The size of the local reaction, which is characterized by a circumscribed erythema and slight edema, may vary from 1 to 3" in diameter. Read the reaction 24 hours after injection. It may persist for 48 to 96 hours. There is rarely, if ever, any necrosis or sloughing of the tissue at the point of the local reaction. In the infected, the local reaction may be accompanied by a more marked manifestation of the present

symptoms. Those that are hypersensitive will show a severe systemic reaction along with the local reaction. Those that have not been sensitized to Brucella and who are probably susceptible to infection show no local or systemic reaction. Often one sees in certain normal individuals an erythema about ½" to 2" in diameter with no edema around the point of the injection. It has the appearance of a nonspecific reaction.

OPSONO-CYTOPHAGIC TEST [1]

Blood Specimen—Collect a 5 c.c. sample of blood in a sterile vial containing sufficient sodium citrate to make a concentration of 0.8 per cent. Keep the specimen in the coldroom until the test is made. Blood samples must be examined within 6 hours to prevent the disintegration of the polymorphonuclear leucocytes.

Bacterial Suspension—Prepare a fresh suspension daily from a 48 hour liver infusion agar culture. Suspend several loopfuls in saline at pH 7.0 to a turbidity of 2 mm. Gates. Suspensions of any of the three species of Brucella are satisfactory so long as they do not become fast to ingestion. Test cultures to "fastness" against immune citrated blood.

The test—Place 0.1 c.c. of whole blood and 0.1 c.c. of bacterial suspension in a clean culture tube. Mix the contents thoroughly and incubate at 37° C. for 30 minutes. Do not resuspend the cells after incubation. Place a small drop of cells on the end of a clean glass slide with a fine capillary pipette. Spread the drop with a second slide as in the preparation of a blood smear. Dry the slide rapidly before an electric fan. Cover the slide with Hastings solution for 15 seconds, then add 1 c.c. of distilled water. At the end of 10 minutes wash the slide free from stain with distilled water. Dry the slide before the electric fan.

Degree of Opsono-cytophagic activity—Count 25 polymorphonuclear leucocytes and record the degree of phagocytosis as follows:

Negative	no phagocytosis
Slight.......	1 to 20 bacteria per cell
Moderate..	21 to 40 bacteria per cell
Marked..	40 or more bacteria per cell

Compare the degree of phagocytosis with the results of the intradermal test and the agglutination test in order to arrive at a diagnosis.

The following system of diagnosis has been proposed by Huddleson:

A PROPOSED SYSTEM FOR THE DIAGNOSIS OF UNDULANT FEVER ACCORDING TO THE RESULTS OF THE AGGLUTINATION, ALLERGIC, AND OPSONO-CYTOPHAGIC TEST

Agglutination Test	*Allergic Skin Test*	*Opsono-Cytophagic Power of Blood*	*Status Toward Brucella*
—	—	Zero to 20 per cent of cells, slight	Susceptible
—	+	Zero to 40 per cent of cells, marked	Infected
+	+	Zero to 40 per cent of cells, marked	Infected
—	+	60 to 100 per cent of cells, marked	Immune
+	+	60 to 100 per cent of cells, marked	Immune

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G. D. CUMMINGS, *Referee*

Tentative Methods for the Bacteriological Diagnosis and Control of Whooping Cough*

The Cough Plate Technic for Isolating B. Pertussis

COUGH PLATE MEDIUM

The cough plate [1] used for the isolation of *B. pertussis* is prepared with a modification of Bordet and Gengou's potato blood agar.[2]

Base:

Peeled sliced potatoes....	500 mg.
Glycerine, U.S.P.	40 c.c.
Distilled water	1,000 c.c.

Boil the potatoes in glycerine and water until soft. Make up to volume, strain through gauze and allow to stand for sedimentation. Siphon off the supernatant liquid.

To 500 c.c. clear potato extract add:

Sodium chloride solution, 0.75%	1,500 c.c.
Agar, Bacto	60 gm.

Let stand for 15 minutes to saturate the agar. Heat until the agar is dissolved and dispense in amounts convenient for storage. Autoclave for 25 minutes at 15 lb. pressure (120° C.). This base may be stored indefinitely.

Finished medium—To the melted base, at 45° C., add blood to make a final concentration of at least 15 per cent. The blood should be used when fresh, never more than 72 hours after it has been obtained. It may be from sheep, horse, or human source, but avoidance of horse blood for the vaccine medium is recommended. Mix the blood with the base by whirling, and pour into plates—about 15 c.c. per Petri plate. Either glass plates or metal boxes may be used.

Checks — Incubate several plates from each lot made for 24 hours at 37° C. to check sterility. Inoculate one plate with *B. pertussis* to check the growth promoting ability, colony appearance, and characteristic hemolytic zone.

Satisfactory plates should be bright cherry red in color, and free from bubbles and lumps of agar. They may

* Report of the Referee on Methods and Reagents for the Diagnosis and Control of Whooping Cough for the Standard Methods Committee on Diagnostic Procedures and Reagents.

be used as long as they remain moist and red, usually 2 to 3 weeks if kept in the cold room.

EXPOSURE OF COUGH PLATES

Hold the uncovered plate 4 or 5 inches from the patient's mouth during several expulsive coughs. If necessary, induce a cough by tickling the throat with a swab, pressing on the larynx, giving a drink of ice water, or some other device. Cover the plate as soon as possible after obtaining cough in order to avoid contaminants from the air.

INCUBATION AND EXAMINATION OF PLATES

As soon as possible after the plates have been inoculated, place them in the incubator at 37° C. Examine them several times during the first 48 hours for molds or other spreading colonies which might overgrow the plate, and cut these out with a sterile needle or scalpel. After about 48 hours, search for colonies of *B. pertussis* using a hand lens. Examine the glass plates by transmitted light, placing them uncovered over an ordinary substage lamp. Examine the aluminum plates by reflected light, placing the lamp on end and tilting the uncovered plate in front of the light which will come from the side. If such plates are questionable, transfer the medium to a glass Petri plate and examine by transmitted light. Examine all plates twice daily until *B. pertussis* is found or the negative ones until they have been discarded—6 days after they were received.

CRITERIA FOR IDENTIFICATION OF B. PERTUSSIS COLONIES

Colony appearance—*B. pertussis* colonies appear smooth, raised, glistening, pearly and almost transparent, while the colonies of Gram-positive cocci in general appear duller, darkly colored, and opaque. They are surrounded by the characteristic zone of hemolysis—a zone which is not sharply delimited but merges somewhat diffusely into the surrounding medium.

Consistency of the growth—The consistency of the growth and the manner of its diffusion into water are typical of *B. pertussis*. As a loop of growth touches a drop of water or salt solution, it spreads and shows at first a momentary clumping effect but with very slight agitation it quickly smooths into a homogeneous suspension.

Morphology and staining reaction—Stained by Gram's method, *B. pertussis* decolorizes readily—much more readily, in fact, than does *H. influenzae*. Viewed microscopically, the small, faintly-stained coccoid bacilli are scattered evenly throughout the film, occurring singly for the most part, seldom in chains of even 2, and not found as pleomorphic threads. Frequently they show bipolar staining.

Agglutination tests — Questionable colonies may be tested by a *slide agglutination* technic. Suspend the colonies to be tested in a drop of saline on a slide and mix a loopful of this suspension with a loopful of *B. pertussis* antiserum diluted 1:10. Observe for immediate agglutination, in comparison with the remaining suspension to which serum was not added. For larger amounts of culture and for quantitative results use the *rapid agglutination technic*, described later.

Identification by sub-culture—If a questionable colony cannot be identified with certainty, make a sub-culture to a cough plate, spreading the colony over a small area. There will usually be sufficient growth after 24 hours' incubation for a slide agglutination test and stained preparation.

REPORTING THE FINDINGS

Positive plates may be reported as soon as found. Plates showing no colonies of *B. pertussis* on the 4th day

may be reported as negative to date. The plates should be examined for 2 more days, and additional reports made if any plates are found positive.

BIOLOGICAL CHARACTERISTICS AND REACTIONS IN ANIMALS

To encourage antigenic stability of the cultures (see references 3, 4, and 5), they should be kept on Bordet-Gengou medium containing at least 15 per cent blood. When adapted to other media such as the ordinary blood or coagulated blood agar, brain-veal, or plain infusion agar, the cultures are likely to change antigenically and also they are more difficult to maintain. In this outline we are concerned more particularly with Phase I cultures—the term used by Leslie and Gardner to describe the antigenic state characteristic of cultures just isolated from patients with whooping cough.

The *colony appearance* on Bordet-Gengou medium and the *staining characteristics* of *B. pertussis* have been described above under criteria for identification of *B. pertussis* colonies. It may be added that capsules can be demonstrated by proper technic. For this, Lawson[4] developed a method in which Wright's stain is used. The method of Churchman and Emelianoff[9] also gives good results.

Cultivation and biochemical reactions[4, 5, 6, 8, 14]—*B. pertussis* is a strict aerobe and grows best at a temperature of 37° C. Some formula based upon Bordet-Gengou potato-glycerine blood agar seems best suited of all known media to meet the growth requirements.

When adapted to certain other media, the growth is characteristic. On *coagulated blood agar,* after several preliminary transfers with heavy inoculum the growth is fairly profuse but after a few days tends to adhere to the medium and to die out in a relatively short time. In shallow layers of *broth medium,* a viscid, ropy sediment with floating strands, is produced. On *potato slants,* the growth becomes tan colored after several days' incubation, in this respect resembling *B. bronchisepticus* although the color change is less marked. *Litmus milk* is made alkaline after a week or more. On *carbohydrate media* there is no reaction. *Indol* is not formed. *Nitrates* are not reduced.

Serological reactions—Phase I cultures form a homogeneous group with respect to agglutination and complement fixation reaction.[2, 6]

The *rapid agglutination technic*[10] is particularly adapted to the study of *B. pertussis* and is given here:

Antigen preparation—With a stiff bent needle, remove the 48 hour growth of *B. pertussis* on Bordet-Gengou medium and suspend in saline. Filter the suspension through a thin layer of cotton to assure a smooth, satisfactory antigen. Adjust the turbidity to approximately 20 billion organisms per c.c., after comparing a diluted sample with a series of known suspensions—a convenient series includes 1, 2.5, 5, and 10 billion organisms per c.c., respectively.

Note: Have ready a supply of test tube cotton filters, prepared as follows: Shape a thin layer of moistened absorbent cotton around the finger, place on the bent end of a strip of copper wire netting as a support, and insert in a test tube of convenient size—with the free end of the wire strip hooked over the lip of the tube. Shape the cotton against the walls of the tube with a wooden applicator, plug the tube and sterilize. After use for filtration, remove and discard the filter—re-inserting the sterile plug.

For larger filters for use in flasks, wrap the cotton around the outside of a square of wire netting cut from a bias strip and shaped to fit inside the neck of the flask. Cover this with a single thickness of gauze. Suspend the filter by two wires which cross under it, pass through the netting, and hook over the lip of the flask.

Preparation of antiserum—Immunize a rabbit against a Phase I culture of *B. pertussis,* using a 10 billion suspension of a 48 to 72 hour culture on Bordet-Gengou medium, killed by contact with merthiolate 1:10,000, 48 hours or more in the cold room. Inject 3 doses intravenously—0.4, 0.8, and 1.0 c.c., respectively, per kg. weight, at 3 or 4 day

intervals. Make a trial bleeding about 1 week after the third injection. If the agglutination titer ("equivalent" as described below) is approximately 1:20,000 with the homologous culture and with several other recently isolated strains, bleed the rabbit from the heart or carotid. Inactivate at 56° C. for 30 minutes.

Dilution of the antiserum—A scheme for diluting the serum such as follows is convenient for a series of tests in which no more than 2 c.c. of each serum dilution will be required.

Dilutions lower or higher, or in a closer range, and smaller or larger quantities may be prepared as indicated.

The agglutination test—Mix 0.1 c.c. of each serum dilution with 0.1 c.c. of antigen, the measurements being made with 1 c.c. pipettes graduated in 10ths. For an antigen control, mix 0.1 c.c. of saline with 0.1 c.c. of antigen.

Shake the mixture by hand for 3 minutes, rocking the racks at the rate of approximately 60 back-and-forth motions per minute, and in such a way that the contents flow about three-quarters of the length up the tube.

After the period of shaking, add physiological salt solution to facilitate reading. The Hipple pipetting apparatus, used in the Kahn test, and set to deliver 0.5 c.c. of saline is convenient for large series of tests.

Reading the results—Read the reactions immediately after adding saline. Record each tube as —, ±, +, ++, +++ or ++++, according to the degree of agglutination. In determination of a titer, ++ is the lowest reading to be considered as an end point.

Interpretation of results—Since in the literature agglutination titers are apt to be expressed in terms of the usual 1 c.c. test, it is important to reduce the quantities of reagents used in the two tests to equivalent terms.

In the 1 c.c. test a culture suspension of about 4 billion per c.c. is required and 0.5 c.c. of this is mixed with 0.5 c.c. of diluted serum. In the 0.2 c.c. rapid test, 0.1 c.c. of a 20 billion per c.c. suspension is mixed with 0.1 c.c. of serum. That is, in testing any particular serum dilution, one-fifth as much serum is used in the rapid test as is employed in the 1 c.c. test with the same dose of antigen. This means that on the basis of the actual amount of serum present in the dilution being tested, any particular final dilution in the rapid test is equivalent to 5 times that final dilution in the other test. For example: a series of serum dilutions 1:10 to 1:2,500 in the rapid test gives a series of final dilutions 1:20 to 1:5,000, which corresponds to a series of final dilutions in the 1 c.c. test of 1:100 to 1:25,000.

A CONVENIENT DILUTION SCHEME

		To Make Serum Dilution		
Tube No.	*Serum Dil. Required*	*Serum Dil. to Be Used*	*Serum c.c.*	*Saline c.c.*
1	1:10	undiluted	0.3	2.7
2	1:50	1:10	1.0	4.0
3	1:100	1:25	2.5	2.5
4	1:250	1.100	1.0	1.5
5	1:500	1:100	0.5	2.0
6	1:750	1:100	0.5	3.25
7	1:1,000	1:100	0.7	6.3
8	1:1,500	1:1,000	2.0	1.0
9	1:2,000	1:1,000	1.0	1.0
10	1:2,500	1:1,000	1.0	1.5

Reactions in animals—For reports of transmission of pertussis to monkeys by the injection of *B. pertussis* cultures see references 15, 16, and 17. In certain other animals, characteristic reactions follow injection of the culture and constitute helpful criteria in the study of *B. pertussis*.

A *skin reaction* is produced in rabbits and guinea pigs by the intracutaneous injection of a living suspension of *B. pertussis* Phase I. Within a few hours after injection there is an ischemic indurated area at the site of injection. By 24 hours a purplish center appears, surrounded by an

ischemic ring and beyond that, the outer part of the indurated zone appears inflamed and may show an arborization of capillaries. The central zone develops into a definite dark purple necrotic area by the end of 48 hours. After a few days, depending upon the intensity of the reaction, a scab takes the place of the purple zone, and later a scar indicates the site of inoculation. A dose of 0.1 c.c. of a 1 billion per c.c. suspension gives a reaction about 1 cm. in diameter.

Intraperitoneal injection of mice and guinea pigs with a suitable dose of *B. pertussis* Phase I is followed by death and characteristic gross pathology at autopsy. The killing dose shows considerable variation with individual animals. Usually a dose of 1 c.c. of a 5 billion per c.c. suspension kills a mouse within 72 hours. Twice this dose is usually required for guinea pigs. At autopsy there is observed a more or less extensive hemorrhagic area in the peritoneum at the site of injection, and occasionally an area of necrosis in the skin. The peritoneal fluid is increased—markedly so in the guinea pig. Frequently all organs and membranes are covered with a sticky mucoid exudate. Grossly, heart, lungs, liver and spleen show no changes. There is marked congestion around the reproductive organs. *B. pertussis* may be recovered with ease from the peritoneal fluid. Cultures from the heart's blood of the mice usually show *B. pertussis*.

B. PERTUSSIS VACCINE

CHOICE OF CULTURES

For each lot of vaccine, select several Phase I pertussis cultures which have been kept only on Bordet-Gengou medium containing at least 15 per cent blood. Just prior to their use, the cultures should be checked for Phase I characteristics [11]: typical colony appearance on Bordet-Gengou medium, including hemolysis of red cells; typical morphology and staining reactions; agglutination with Phase I antiserum; pathogenicity for mice; and skin reaction of hemorrhagic necrosis in the rabbit.

PREPARATION OF VACCINE[11, 12, 13]

B. pertussis vaccine medium—Use the cough plate medium previously described.

Inoculation of the medium—Prepare seed flasks by inoculating 500 c.c. French square bottles, each with 3 c.c. of a 10 billion per c.c. suspension in broth or salt solution of a 48 to 72 hour growth of *B. pertussis*. If larger flasks or bottles are used, vary the inoculum accordingly. Tilt the bottles until the entire surface is covered with the inoculum. After the seed flasks have incubated for 48 to 72 hours, suspend the growth in broth or salt solution and check for purity by Gram-stained preparation. Using the seed suspension, inoculate 1,000 or 500 c.c. bottles, 3 c.c. per 500 c.c. bottle. Twenty-five to 30 bottles make a reasonable number for one planting and one 500 c.c. seed bottle will afford sufficient inoculum for 6 French squares of 500 c.c. capacity.

Incubation—Incubate at 37° C. for 72 hours.

Harvesting—Discard any obviously contaminated bottles before beginning harvest. Wash off the growth on the surface of the medium with physiological salt solution using 3 or 4 c.c. per bottle. To loosen the growth, use sterile glass rods bent to reach the corners of the bottles. Make Gram-stained preparations from each bottle and examine for purity of the growth. Discard or study further by sub-culture any bottles suspected of contamination. Pool the suspensions from the remaining bottles. Wash off the residuum of growth with an additional 2 or 3 c.c. of salt solution. For 1 liter of vaccine,

about 50 bottles of 500 c.c. capacity are required.

Washing the suspension and adding the killing agent—By the addition of salt solution, adjust the pooled suspension to compare roughly with the turbidity of a known 10 billion suspension. Centrifugate in 250 c.c. centrifuge bottles for 1 hour, or until the supernatant is fairly clear. Discard the supernatant and resuspend the sediment in saline containing merthiolate 1:10,000 or phenol 0.5 per cent. The volume of this suspension should be somewhat less than that required for a 10 billion suspension to allow for dilution during standardization.

Filtering—Using a cotton and gauze filter (described under the agglutination technic), fitted into the mouth of a flask, filter the suspension to remove particles of medium and insure a smooth, even product. Wash the filter with about 10 c.c. saline to reduce loss.

Killing the organisms—Allow the suspension which contains merthiolate 1:10,000 or 0.5 per cent phenol to remain at cold room temperature for at least 1 week. Shake several times daily.

Sterility and purity tests—After the period in the cold room spread 0.1 c.c. on a Bordet-Gengou plate streaking out on half the plate. Inoculate fermentation tubes containing 25 c.c. of dextrose broth with 0.5 c.c. and 0.2 c.c. respectively. Incubate at 37° C. for 5 days.

Make Gram-stained preparations and examine for purity of the suspensions.

Standardization of turbidity—Remove 5 c.c. of the suspension from the flask and compare the turbidity with that of a known 10 billion suspension. See "Turbidity Standards" below. If the suspension to be standardized is markedly denser than the standard, dilute the entire lot to approximately 10 billion by the addition of salt solution plus merthiolate 1:10,000. Make 1:2, 1:4, and 1:5 dilutions of the adjusted suspension in vials of the same diameter as the standards and compare with the 5, 2.5, and 2 billion standards respectively. Slight differences in turbidity can be more easily detected if a printed sheet is held behind the vials, and the suspensions examined against a bright light. Dilute the lot as indicated by these comparisons, and re-check the final suspension with a second series of dilutions.

Turbidity standards—Prepare a suspension of *B. pertussis* as for a vaccine. Adjust to 10 billion per c.c. by a series of direct counts in a Petroff Hauser chamber. Check this suspension by a Hopkins tube determination as follows:

Place 5 c.c. of the suspension in a Hopkins tube and centrifugate at 2,800 r.p.m. for 30 minutes. At this time the supernatant should be clear and the organisms packed in the narrow graduated portion of the tube. If this has not occurred, centrifugate for an additional 10 minutes. Determine the amount of packed organisms in the tube as indicated by the graduations. If the two methods check, the sediment will represent 0.3 per cent of the volume. Occasionally a suspension is encountered which does not pack well in a Hopkins tube. Such a suspension should not be chosen for use as a standard.

Make 1:2, 1:4, and 1:5 dilutions of the 10 billion suspension, corresponding to 5, 2.5, and 2 billion per c.c. respectively. Seal 5 c.c. amounts of these standard suspensions—four including the 10 billion—in vials. They will keep for an indefinite period.

Filling the vials—Dispense the vaccine as desired. For individual injections, 1.5 c.c. quantities in 2 c.c. ampules are convenient; for clinic use, larger quantities are more satisfactory.

TEST OF THE FINAL PRODUCT

Sterility and purity—Test sterility in accordance with the methods outlined by the U. S. Public Health Service for the testing of biological products. In addition, from each vial tested, plate 0.1 c.c. amounts of the vaccine on blood agar and pertussis vaccine medium, and observe daily for 7 days.

Antigenicity—Test the *agglutinability* of the vaccine with a Phase I antiserum which has an equivalent titer of at least 1:10,000. The vaccine should be agglutinated approximately to the titer of the serum. Test for *agglutinin production* in the rabbit by injecting 0.2 c.c., 0.4 c.c., and 0.8 c.c. respectively per kg. weight intravenously every 3rd or 4th day and testing on the 7th day after the last injection. If the equivalent titer is not at least 1:10,000 make a fourth injection of 0.8 c.c. per kg. rabbit weight and test again after 7 days.

Safety tests—Inoculate intraperitoneally 3 guinea pigs weighing about 300 gm. with 0.5 c.c., 1.0 c.c., and 1.5 c.c. respectively. Observe daily recording loss of weight and any symptoms of toxicity. All animals should live and should regain their original weight by the end of 2 weeks.

RELEASE OF VACCINE

Release a lot of vaccine only when tests of the final product show it to be sterile, pure, antigenic and safe.

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Methods in Health Education*

FOLLOWING the 1934 Annual Meeting, the *Chairman*, Marjorie Delavan, appointed a Committee on Methods in Health Education.

The work of the committee has been largely conducted by correspondence except for one meeting of 3 members at Saranac Lake in June, 1935, and conferences among members as opportunity permitted.

1. Consideration has been given to the objectives of the Section, of meetings, and of the health education movement. It is believed that an attempt should be made to formulate more fully definitions and perhaps criteria of standards of health education, and of relationships. In this regard, definitions prepared by the American Physical Education Association should be studied. (See December, 1934, *Journal of Health and Physical Education.*)

Contact should be established with the sub-committee of the Committee on Professional Education dealing with the problem of health training for health educators. (Sundwall, Shepard, Connolly, Edna Gerken, and Turner.)

2. From the viewpoint of our obligation to the health education movement, we may regard our meetings:

(a) As a place for presentation and discussion of tried (but not established) procedures and of established procedures, both as regards procedures in health education and in the fields of other sections which have a bearing on health education.

(b) As a place for expounding new conceptions which seem worthy of consideration. Ultimately there might be established a body of fact and experience for guiding principles and practices as a result of the accumulation of discussions over a period of years.

From the viewpoint of our obligation to the members, we might consider for meetings:

(a) Some definite didactic presentations under a leader who is a real teacher (the material in outline form to be given to the audience).

(b) Some forum and symposium meetings.

3. Consideration should be given to the desirability of preparing a manual of methods. Is it feasible to compile elementary methods in health education which would aim to be as specific as the directions for the standard methods of water analysis or the methods for record keeping (Walker and Randolph)? How inclusive can these methods be regarding health education in schools? Can a beginning be made in the formulation of a local publicity program for a health department? Could two or three subjects be selected for study the first year, with a referee appointed for each subject as was done by the laboratory section for the Committee on Standard Methods? For those who may argue that such crystallization of practice would result in stagnation, we need only point to the *Appraisal Forms* which have been revised from time to time as experience dictated.

* Progress Report of the Committee of the Public Health Education Section.

If the Section contains a large representation of health education teachers, a sub-committee from this group might formulate this phase of the Section program.

The Public Health Education Section should be the group to give positive and tangible suggestions for the promotion of health education in various types of communities.

More specifically, one member of the committee, Miss Nickerson, has summarized some of our obligations as a section as follows:

1. To professional workers

(a) Point out their potentialities in health education—facts that should be given to the public—newspaper publicity, how to detect a news story and write it up—use of statistics to show progress, etc.

(b) Place accepted technics and methods at their disposal, and assist them in making practical use of them.

(c) Teach them the right psychological approach so that groups in their community differing widely as to race, economic level, and intellect may receive health information in terms they can understand.

(d) Help them to coördinate their work with others toward a more complete health program in the community.

(e) Show them how to evaluate their results by the use of graphic methods.

(f) Help them to adapt their special technical information to practical use.

2. To schools

(a) Keep them well informed on authoritative scientific facts on health and disease.

(b) Point out special methods for presenting these.

(c) Place the best source material at their disposal.

To this end, our Section has a duty to its members

(a) To develop standards in health education.

(b) To put its stamp of approval on and present accepted technics and methods that are known to bring the best results.

(c) Teach them to look for results by way of graphic illustrations (it might be well to have a whole session on graphs and charts, how to make them, how to read them—their usefulness, etc.).

The committee consists of the following members of the Section: Homer N. Calver, Mary P. Connolly, Elizabeth Nickerson, Evart G. Routzahn, W. P. Shepard, and Marjorie Delavan, *ex-officio*.

IRA V. HISCOCK, *Chairman*

Bathing Places*

THIS committee has been asked to review the comprehensive reports of the former committee assigned to a study of this subject and present a report to both of our associations with a view to later acceptance by the Committee on Research and Standards of the American Public Health Association. The excellent pioneering reports prepared in 1925 and 1927 by the former committee headed by Stephen DeM. Gage have been used as a guide in swimming pool sanitation since they were published. In view of the completeness of these former reports, the present committee's report is to a considerable measure composed of the older reports. There are, however, some additions and modifications submitted, dealing largely with the following subjects: outdoor bathing places; cross-connections in swimming pools; streptococci tests; residual chlorine tests; foot infections; and bathing loads. Some of the discussion on these subjects is taken from the 1930 and 1932 reports of the Joint Committee. Where particular subjects are presented verbatim from the 1927 committee report (published in the February, 1928, issue of the *American Journal of Public Health*), the heading is marked with an asterisk. The same numbers are given to various sections as are in the 1927 report. This manner of presentation would seem to offer a more useful report than would a report whose reading is interpolated with comments on the older reports. It should be understood that the bulk of this report as to swimming pools represents the work of Mr. Gage, *Chairman,* and the other members of his former committees, to whom great credit should be given. No attempt has been made to revise the earlier reports except where changes were considered to be of importance.

Extent and Prevalence of Disease Transmission by Bathing Waters—This subject might be divided into two categories: those diseases which might be spread in relatively small swimming pools where the danger of transmission is from one bather to another, assuming a safe source of water supply, and those diseases which might be caused at outdoor bathing places where there are also the dangers from waters polluted by sewage from public sewerage systems and other extraneous sources. Another distinction might be drawn as to the types of possible diseases: whether eye, ear, nose and throat infections, or skin infections such as ringworm, eczema, scabies, etc., or venereal infections, or gastrointestinal disorders.

In 1921 a committee of the American Public Health Association attempted to assemble data on the subject of spread of disease from bathing waters by sending out 2,000 questionnaires to physicians and health officers, of which 627 were answered. The replies indicated suspicions that most of the diseases to which man is susceptible may have been caused by contaminated bathing water or insanitary bathing place appurtenances. Despite these replies, it must be admitted that there is a great

* Progress Report of the Joint Committee on Bathing Places of the Conference of State Sanitary Engineers and the Public Health Engineering Section of the American Public Health Association.

dearth of epidemiological information as to just what sickness is caused by bathing in polluted water.

Conditions pertaining to bathing waters are decidedly different from those surrounding public drinking water supplies. Many persons swallow little or no water during bathing—particularly is this true of salt water—and there is fairly rapid change of water at the majority of bathing places. These considerations tend to promote likelihood of occurrence of sporadic cases of such diseases as typhoid fever among bathers as against epidemics such as may occur with polluted drinking water supplies.

Considerable interest has been evidenced by many public health workers in the possibilities of spread of skin infections from bathing. Some cases of skin eruptions on the bodies of bathers have been reported. Some investigators have concluded that a skin infection designated as "Schistosome dermatitis" has affected bathers in the waters of lakes, rivers, ponds, or beach pools which support snails. The causative agent is said to be the *cercaria,* free swimming larval stage of certain parasitic worms, of the family *Schistosomatidae.* Unfortunately it is a fact that little is known as to the exact manner of spread of many skin infections—whether the infection is spread by the use of bathing place appurtenances such as walkways, common towels, suits, or drinking cups, or by other contacts such as might occur on a public playground, or whether the water has acted simply as a vehicle of transmission of disease germs from one bather to another, or whether the infection has been from bodily excretions present in the water.

Eye, ear, nose and throat infections are reported. Some of these might be due to lowering of resistance from chills; water may wash away protective mucous discharges containing antibodies, leaving the affected parts susceptible; harmful organisms already present in the body may be washed further into the ear and nasal passages during bathing; or excessive amounts of chemicals used for water purification may cause inflammation of mucous membrane and irritation of the skin. These are all possibilities aside from any harmful infections in the water.

The summary of the replies in the 1921 report when considered in the light of known epidemiological evidence, leaves this committee unconvinced that bathing places are a *major* public health problem even though bathing place sanitation, because of the health considerations involved, should be under careful surveillance of the public health authorities, and proper sanitary control of bathing places should be exercised. Indeed, this report is prepared for that particular purpose. It is realized that new epidemiological evidence may develop. It is agreed that common sense public health programs must recognize that bathing in polluted water is a potential danger, that insanitary conditions surrounding public bathing places are a hazard, and that common decency as well as health considerations dictate that reasonable steps should be taken to secure bathing in clean environments.

These conclusions are stated as an answer to a growing demand that this committee or some other group of public health workers propose a rigorous bacteriological or other standard, whereby bathing in certain outdoor bathing waters should be condemned from a public health standpoint. There is submitted in this report a proposed method of intelligent sanitary classification of outdoor bathing places with the inauguration of promotional educational programs to provide safer and more decent conditions as against extensive arbitrary programs of bathing place condemnation, and the recommenda-

tions of the 1927 committee toward provision of what are considered to be readily attainable and necessary sanitary precautions for swimming pools are also affirmed.

Drowning and Other Accidents at Bathing Places—This report includes various recommendations of the former committee as to safeguards against drowning and other accidents at bathing places, particularly at swimming pools. These safeguards should receive consideration from health workers.

I. *Classification of Bathing Places*

*A.

*B.

II. *General Principles of Bathing Place Sanitation*

*A.

*B.

*C.

*D.

*E.

*F.

III. *Bathing Beaches*

This subject is discussed in Sections XXIX to XXXIV of this report at considerably greater length than in the 1927 report.

SWIMMING POOLS

IV. *Location and Layout of Pools*

*A.

*B.

*C.

*D.

*E.

F. At indoor pools where chlorine disinfection is to be used it is recommended that the chlorine apparatus be so located as to be readily observed.

V. *Design and Construction Features*

*A.

*B.

*C.

*D.

*E.

*F.

*G.

*H.

I. Pool Lining. Including bottom and sides up to runways lining must be of white or light color material and present a smooth finished surface without cracks or joints. All corners must be rounded. Tile or glazed brick lining is recommended for all indoor pools and for small outdoor pools. White cement smoothly finished is satisfactory for large outdoor pools. Dirt does not show on asphalt or other similar dark material and such materials are not suitable for pool lining. Sand or earth bottoms cannot be kept clean and are not recommended for pools.

*J.

VI. *Proportioning Pool Area to Expected Load*

*A.

*B.

*C.

*D.

VII. *Inlets and Outlets*

*A.

*B.

C. Proper pipe connections must be provided in recirculation pools to permit water being drained to the sewer as well as to recirculation pumps. No direct connections to sewers should be permitted and all pool drains to sewers should be broken at a point where any sewage which may back up from the sewer will overflow to waste instead of being permitted to reach the pool. Pumping of pool drainage to an elevation above any possible sewer backing may in some cases be needed.

D. Inlets for fresh or re-purified water should be located to produce so far as possible uniform circulation of water throughout the entire pool. In semi-artificial pools of irregular shape a careful study should be made of probable circulation currents, and inlets should be located and spaced to provide as complete circulation as possible. Inlets from the circulation system should be submerged to reduce escape of chlorine odors. Where water from the public water system is added to the pool, cross-connections between the public water system and the swimming pool water should be eliminated by pumping make-up water from a pump suction well or admitting water to the pool above the overflow elevation of the pool. It is recognized that the avoidance of cross-connections in this manner may require the installation of a separate heater on the line supplying make-up water—particularly where large amounts of make-up water are added.

*E.

F. (Same as "G" in old report.)

G. (Same as "H" in old report except that words "cross-connections" in third sentence are changed to "connections.")

VIII. *Scum Gutters*

*A.

*B.

*C.

IX. *Steps, Ladders, and Step Holes*

*A.

*B.

*C.

X. *Runways or Sidewalks*

*A.

*B.

*C.

*D.

XI. **Visitors' Galleries*

XII. *Dressing Rooms*

*A.

*B.

*C.

*D.

E. All dressing rooms and appurtenances must be kept clean at all times. The use of an insecticide spray for lockers and of a disinfectant on floors, walls, and seats at frequent intervals is recommended. A 0.3 to 0.6 per cent solution of available chlorine is suggested as a disinfectant, to prevent the spread of foot infections. Foot tubs without proper disinfectant solution should be prohibited.

XIII. *Showers, Toilets, Lavatories*

A. Adequate shower bath facilities with hot and cold water must be provided at all artificial pools. The minimum number of showers provided should be in the proportion of one for each 40 bathers expected at time of maximum load, in the case of continuous bathing. For bathing by classes, as at schools, the number of showers may be taken as one-third the number of pupils in the maximum class.

*B.

*C.

*D.

*E.

F. Water flush toilets should be provided wherever possible. All toilets should be properly maintained.

*G.

H. The use of solutions containing 0.3 to 0.6 per cent of available chlorine has been found of value as a foot wash for the prevention of skin infections. At many swimming pools, bathers are required to rinse their feet in such a solution before entering the pools. Many authorities consider it preferable to place the foot bath at the exit from the showers to the dressing rooms so as to spread the chlorine over the dressing room floor and increase the time of contact. In some cases, 15 per cent sodium thiosulphate solutions have been used with success as a preventive foot wash but in one large city poor results with this chemical have been reported. One reason attributed to lack of success with sodium thiosulphate is failure to employ freshly made up solutions using a good grade of chemical. Sodium thiosulphate is a reducing agent and will reduce the available chlorine in the pool if bathers use it in a foot bath before entering the pool so that its use should be limited to bathers leaving the pool.

XIV. *Lighting, Ventilation and Heating*

*A.

*B.

*C.

*D.

*E.

F. All heating units shall be isolated or protected from contact with bathers to prevent injury. The heating units in dressing rooms, shower rooms, and toilets shall be capable of maintaining a temperature between 70° F. and 75° F. The pool room heating units shall be capable of maintaining a temperature between 75° F. and 82° F. Thermostatic control of the temperature is desirable.

G. The acoustical property of pool rooms has not received the attention it deserves. Designs and materials of construction, which will prevent reverberations of sound that result in confused noises, should be used. It is very important that an instructor's voice or a call for help may be clearly distinguished.

XV. *Recirculation System*

*A.

*B.

*C.

*D.

*E. (Add "below the water surface" after "Fixed pipe connections" in last sentence.)

*F. (Add "It is recommended that piping used for different purposes be painted distinguishing colors.")

*G.

H. Thermometers. At indoor pools a fixed thermometer shall be placed on the recirculation line beyond the heater and another near the outlet of the pool. At outdoor pools one thermometer is usually sufficient. Thermometers shall be accessible and have a type of scale that is easily interpreted.

I. Cross-connections. The avoidance of cross-connections on the pool piping system whereby pool water may under some conditions enter a potable water supply system which is connected either for admission of new water to the pool or for washing of filters is discussed in Sections VII D and XVII E. The possibility of polluting pool water from sewer connections is discussed in Section VII C. The dangers of cross-connections are also stressed under this heading.

XVI. *Proportioning the Water Interchange for Recirculation and Flowing Through Pools*

*A.

*B. (Change first two sentences to the following: "Gage and Bidwell have worked out the law of purification by consecutive dilution as applied to recirculation and flowing through pools and this is described by them as follows: ")

XVII. *Filtration*

*A.

*B.

*C. (Add after first sentence "Experience has shown that satisfactory results are secured when the effective size of the sand is about 0.4 to 0.5 mm. with a uniformity coefficient not exceeding 1.75. Sand should be washed free from clay, organic matter, and soluble material.")

*D.

E. Rapid filters of open gravity type must be equipped with loss of head gauges. Pressure filters must be equipped with pressure gauges, on both the inlet pipe and the outlet pipe for determination of loss of head or back pressure in the filter medium. Pressure filters should have a proper sight glass installed on the waste discharge pipe by which the operator may watch the progress of filter washing. Such glass should be readily removable for cleaning, and should be kept clean. When pressure filters are located at an elevation above the water line of the pool, each filter must be equipped with an automatic air relief valve. The arrangement and number of valves and interconnecting piping, or "valve nest," for necessary and convenient operation of rapid filters is fairly well standardized, and a discussion thereof may be omitted. It is usually desirable to have 3 or preferably 4 pressure filter units so that 1 unit can be cut out of use and washed with the filtered pool water. With 4 filter units in ordinary use, 1 filter can be washed with the use of the recirculation pump at 4 times the ordinary filtering rate. If washing with the recirculation pump is not feasible, a wash water pump of higher capacity may be installed and a suction well or small elevated feed tank, supplied from above with water from the public water system, can be used to supply water to the pump. Valved cross-connections whereby water from a potable water supply may be admitted directly to the recirculation system for the purpose of filter washing may permit pool water to gain access to the potable water supply because of leaking valves or suddenly lowered pressures. They shall not be permitted in the case of new swimming pools. In some instances, the elimination of existing cross-connections between potable water supply systems and swimming pools is difficult. Each case should be considered in the light of existing conditions, and remedies should be sought as dictated by the relative danger and the practicality of carrying out improvements. Where such cross-connections are permitted to remain in existing swimming pools, extraordinary precautions should be required to safeguard the potable water supply.

*F.

*G.

*H.

XVIII. *Disinfection*

A. From all available information, the addition of chlorine either as a gas or in a water solution by use of proper apparatus is today the most satisfactory method of pool disinfection. It is possible not only to disinfect the entire body of water in the pool completely with chlorine, but also maintain in the pool water at all times a residual amount of disinfectant to sterilize immediately any dangerous pollution disseminated by bathers. With the proper chlorine apparatus it is also possible to increase or diminish the dosage as required to compensate for variations in the bathing load. The committee recommends the use of chlorine either as a gas or in a water solution for disinfection of all pools where there is any appreciable bathing load, or where bathing suits are worn. Recent developments indicate that the use of ammonia and chlorine for swimming pool disinfection has become increasingly popular because of the more lasting qualities of the chloramines thus formed and the possibility of carrying higher disinfecting dosages without production of irritating effects from the use of large amounts of chlorine. Reports have reached the committee that much more satisfactory results from the standpoint of avoidance of loss of chlorine from disinfected swimming pool water and of less trouble with chlorine odors have been obtained by carrying high alkalinities in the water. Experiments indicate a delayed germicidal action of chlorine with high accompanying pH content of the swimming pool water, decidedly so at a pH of 7.7, similar to the delayed action with chloramine treatment, which is a factor to be considered. The fact that chloramines are decidedly slower-acting disinfectants than chlorine alone, makes it appear to the committee that chlorine is a safer disinfectant that chlorine and ammonia. Under some conditions such as in very large or outdoor pools, however, chloramine dis-

infection may produce better over-all results.

B. A possible objection to the use of chlorine for indoor pools is the chance of accidental escape of gas into the room. Modern chlorine apparatus is carefully designed and built to prevent possibility of such accidents. As a factor of safety it is advisable to install the chlorinator and chlorine containers in a special closet or room, with vents near the floor connecting with the outside air. A chlorine gas mask is a desirable safeguard to have on hand in case of accident. Such masks should be checked up occasionally to make certain that they have not decreased in effectiveness.

C. There are now on the market machines which feed hypochlorite solutions for disinfection. Chlorine compounds may be used to make up fairly stable disinfecting solutions and so long as their strength is checked by means of residual chlorine tests on the pool water, they may be very satisfactory. There are also chlorinators in use which produce chlorine by electrolytic action on sodium chloride solutions.

*D.
*E.
*F.
*G.

H. The use of ionized silver for swimming pool sterilization has been developed abroad and to a very limited extent in this country. While satisfactory bacteriological conditions have been reported in pools using such treatment, there is a question as to how rapidly this disinfectant acts on infectious material which may be discharged into the pool water by bathers. More information is needed concerning this process, pending which the committee is unable to make a definite recommendation at this time as to its use.

XIX. *Diving Towers, Spring Boards and Floats*

*A.
*B.
*C.
*D.

XX. *Emergency Equipment*

*A.
*B.

XXI. *Suits, Towels and Caps*

*A.
*B.
*C.
*D.
*E.
*F.
*G.

XXII. *Supervision of Bathers*

*A.
*B.
*C.
*D.
*E.
*F.

XXIII. *Personal Regulations*

*A.
*B
*C.
*D.
*E.
*F.
*G.
*H.
* I.
* J.

XXIV. *Chemical and Physical Quality of Swimming Pool Water*

A. Excess chlorine. Whenever chlorine, calcium hypochlorite, or other chlorine compounds, without the use of ammonia, are used for swimming pool disinfection, the amount of available or excess chlorine in the water at all times when the pool is in use shall not be less than 0.4 p.p.m. or more than 0.6 p.p.m. Whenever chlorine or chlorine compounds are used with ammonia, the amount of available or excess chloramine shall not be less than 0.7 p.p.m. or more than 1.0 p.p.m. Attention is directed to the possibility of interference by nitrites with the orthotolidin test, particularly when chlorine-ammonia disinfection is employed. If readings are made on the water to be tested within 5 to 10 minutes after the orthotolidin is added, and samples are kept away from the light during this period, the nitrite interference will be decidedly lessened. Standards for determining chlorine residuals shall be prepared and used according to the recommendations in *Standard Methods of Water Analysis* of the American Public Health Association. Standardized color discs and comparators may be used.

B. Acidity-Alkalinity. Whenever alum or sulphate of alumina is used during purification or repurification of swimming pool waters, the water at all times when pool is in use shall show an alkaline reaction. This means that the hydrogen ion content of the pool water shall not fall below 7.0.

*C.
*D. (Change 72° F. to 78° F.)

XXV. *Bacterial Quality of Swimming Pool Waters*

*A.
*B.
*C.

D. All chemical and bacterial analyses should be made in accordance with the pro-

cedures recommended in the *Standard Methods of Water Analysis* of the American Public Health Association in so far as these methods are applicable to swimming pool waters. In order to secure a true picture of the condition of the swimming pool water at the time of sampling, it is recommended that sodium thiosulphate be employed to neutralize the chlorine residual in the water sample bottle during transportation to the laboratory.

E. The part played by the various strains of streptococci in the respiratory diseases and their prevalence in the intestinal, buccal, and nasal discharges make the presence of streptococci in bathing waters very undesirable. Yet to eliminate them from swimming pools would mean decidedly smaller bathing loads and decided increases in chlorine residuals, either or both of which would hamper the usefulness of the pool. The committee calls attention to the fact that streptococci tests are of value in passing on the condition of swimming pool water but does not recommend any uniform standard limit for their presence.

F. 1. Preparation of bottle for sampling. All bottles of chlorinated swimming pool water shall be collected in bottles treated with sodium thiosulphate. The purpose of using water sample bottles containing sodium thiosulphate is to reduce the chlorine present in a treated water at the moment the sample is collected to prevent a continuance of the killing action of the chlorine on the bacteria while the sample is being transported to the laboratory. The bacteriological examination then shows the true sanitary quality of the water at the time the sample was collected.

2. Several procedures for preparing the bottles are presented.

For moist heat sterilization

Option 1. The sodium thiosulphate solution is prepared by dissolving 1.5 gm. of sodium thiosulphate in 100 ml. of distilled water. One-half ml. of this solution is placed in each clean bottle. (This amount has been found sufficient to reduce completely residual chlorine in an amount up to 2.0 p.p.m. in a sample of 130 ml. of water.) After the introduction of the sodium thiosulphate solution, the bottle is stoppered and capped. The bottles are then placed in an autoclave and sterilized for 15 minutes at a pressure of 20 lb. per sq. in.

Option 2. Into clean wet bottles, add approximately 0.02 to 0.05 gm. of powdered sodium thiosulphate. The amount need not be weighed. An estimated amount on the tip of a spatula is sufficiently accurate. The bottles are sterilized as in *Option 1.*

For dry heat sterilization

Into clean dry bottles is added from 0.02 to 0.05 gm. of powdered sodium thiosulphate as in A, *Option 2.* The bottles are stoppered, capped, and sterilized at 180° C. for 10 minutes. The temperature of sterilization must not approach 220° C. as sodium thiosulphate decomposes at this temperature.

G. Collection of samples. The samples should be collected by plunging the open bottle beneath the surface, sweeping the bottle forward until filled. The bottle should not be rinsed in the pool or the sodium thiosulphate will be removed. Samples should be collected only when the pool is in use and preferably during periods of heaviest bathing loads during the day.

XXVI. *Cleaning Pool*

*A.

*B.

XXVII. *Bathing Load Limits*

A. Frequency of Changing Water:

1. The total number of bathers using a recirculation type swimming pool during any bathing period shall not exceed 20 persons for each 1,000 gallons of clean water added to the pool during that period. The term "clean water" as used above may be interpreted to mean, new clean water used to refill the pool, new clean water used to replace loss by splashing or during cleaning, water taken from the pool and returned after effective filtration, or any combination of such waters. The bathing period shall be considered as the length of time the average bather stays in the pool. Under usual conditions this may be considered as 30 minutes. The pollution load in any swimming pool will not always vary in direct proportion to the number of bathers nor to the rate of change of the pool water, but will be influenced by effectiveness of filtration, types of bathing suits used, thoroughness of pre-cleansing baths, and other local conditions. Bacteriological examinations of the pool water should be the primary factor in deciding on bathing load limits for swimming pools. Under many conditions it may be found necessary to limit bathing loads still further—perhaps on a basis of applying a figure of 10 persons per 1,000 gallons of clean

water to the 30 minute bathing period as a maximum load in the pool at any one time. It is, of course, recognized that the daily turn-over ratio of pool water in recirculation type swimming pools is of importance as well as the rate of replacement of water during bathing periods, and a reasonable turn-over ratio is needed to help maintain satisfactory conditions in the pool. As stated under "Proportioning the Water Interchange for Recirculation and Flowing through Pools," a turn-over ratio of at least 2 and preferably 3 or more, for heavy bathing loads, should exist. The above figure of 20 bathers per 1,000 gallons in a 30 minute bathing period is offered on the basis of such a range of turn-over ratio. It is the opinion of the committee that with a properly maintained pool the maximum load of bathers in the pool at any one time is of more importance in arriving at safe bacteriological conditions than the total number of bathers per day although intervals when no bathers are in the pool undoubtedly aid by promoting almost complete intermittent sterilization.

2. The total number of bathers using a fill and draw swimming pool shall not exceed 1 person for each 500 gallons of water in the pool between complete changes of pool water without disinfection. Where intermittent disinfection is employed, the number of bathers using the pool will be governed by the safe limits mentioned under "Proportioning Pool Area to Expected Load," and by bacteriological analyses of the pool water. The committee does not recommend the use of fill and draw swimming pools, as stated elsewhere.

3. The total number of bathers using an outdoor pool—partly artificial and partly natural in character, dependent for circulation and replenishment upon an inflow and outflow of water from a clean stream or a well, spring or piped water supply—might be based upon the computation outlined under (1) as a maximum limit, although safe bacteriological conditions should be the principal guide. Where pre-cleansing baths are not used at such pools, reductions in bathing loads will undoubtedly be found necessary to maintain safe bacteriological conditions even with high chlorine residuals. Pre-cleansing baths should, of course, be provided at all pools.

B. Frequency of Disinfection. The committee has decided to omit a previous recommendation as to bathing load limits between successive disinfections in pools practising intermittent chlorine disinfection in view of the recommendations as to maintenance of adequate chlorine residual *at all times* the pool is in use. It is pointed out that experience indicates that far better bacteriological conditions can be maintained with continuous chlorine disinfection. Where a pool is operated with wide fluctuation in chlorine residuals, chlorine resistant organisms may develop at times when the chlorine residual content of the water is low, and it may be necessary to use very high chlorine residuals to destroy them.

C. Area Limitation. One investigator (Mallmann) has concluded that under normal pool recirculation and design conditions, a maximum bathing load limit of 1 bather per 35 to 45 sq. ft. of pool area will result in safe bacteriological conditions with adequate chlorine residuals. In the light of experience, these figures seem reasonable. This area per bather is greater than provided for under the design requirements set under "Proportioning Pool Area to Expected Load," Section VI.

XXVIII. *Operating Control*

*A.

*B. (Change last sentence to read: "Tests for excess chlorine in the water shall be made as frequently during the day as experience proves to be necessary to maintain adequate residuals.")

C. Tests for Acidity. At any pool where alum or sulphate of alumina is used or where artificial alkalinity is added to the water, the pool operator must be equipped with a hydrogen ion testing outfit and must take hydrogen ion tests on the water every day the pool is in use, and more often if necessary.

D. Operating Records. Every pool operator must be supplied with a proper notebook or with blank forms on which shall be recorded every day the number of persons using the pool, peak bathing loads handled, the volume of new water added, the temperature of the water, and the temperature of the air. Whenever a pool is used by both males and females the number of each and whether adults or children should also be recorded. At all pools where artificial circulation, filtration, or any chemical treatment is used, a full daily record must also be kept of the actual time pumps and filters are in operation, of the time each filter is washed or cleaned, of the time and amount of each chemical used or added, of the time the bottom and sides of the pool are cleaned, and the results of all hydrogen ion, excess chlorine, or other tests.

OUTDOOR BATHING PLACES

XXIX. *Definition*

Under this heading are considered bathing places along small streams, rivers, lakes, and tidal waters. Fill and draw and recirculation bathing pools readily subject to artificial purification or to constant replenishment with uncontaminated water are not included.

XXX. *Sources of Pollution*

In a swimming pool whose water is derived from a public or other supply of unquestioned quality, it may be assumed that the presence of organisms of the coli-aerogenes group indicates pollution by human sewage particles. The presence of such bacteria in outdoor bathing places, however, may be due to the wash from cultivated fields, animals, and generally harmless contamination. Routine bacteriological tests do not differentiate between harmful and harmless contamination in such cases. Harmful contamination may be caused by sewage from boats, individual dwellings, hotels, factories, or other establishments; public sewerage systems; refuse dumping; and bathers themselves.

XXXI. *Flowing-through Bathing Pools along Small Streams*

The use of small natural or dammed-up pools along small streams by large numbers of bathers is not recommended unless disinfection is provided, as discussed in the following section. Where such pools are proposed to be used, and will be dependent upon the natural stream flow for cleansing and dilution, it should be ascertained that there is a constant and appreciable overflow of water past the dam under all weather conditions when the pool is to be used. Any small pool patronized by a number of bathers is certain to show bacteriological pollution in considerable amounts unless disinfection is provided. While no specific amount of diluting water for such pools can be recommended, it is probably fair to say that less than 500 gallons per bather per day is too small a diluting volume without disinfection.

XXXII. *Disinfection of Small Flowing-through Bathing Pools*

Disinfection is desirable to counteract pollution introduced by bathers. Hypochlorite in solution or in powdered form may be added to the pool inlet or at various points over the pool area. Chlorination of the pool inlet may be continuous. Several applications of disinfectant over the pool area during the bathing period are usually preferable to one application. Even with disinfection, the same governing factors should be considered in arriving at maximum bathing loads in small outdoor pools as presented under "Swimming Pools" (Sections VI and XXVII), and also the same limits for chlorine residuals are recommended as for swimming pools. Disinfection of large bodies of water is discussed in the following section.

XXXIII. *Disinfection of Large Bodies of Water*

The disinfection of relatively large bodies of water by use of a chloro-boat, so called, has been used with apparently some success in a few scattered instances. In some locations, bathing areas several acres in area have been disinfected satisfactorily by the use of extensive piping systems along the water bottom either for distribution of chlorine disinfecting solutions or for distribution of large amounts of pumped water drawn from the bathing area and disinfected in the pump suction with chlorine or chlorine and ammonia in what is practically a recirculation system. Where such disinfection is feasible, the same contents of chlorine and chloramine residuals are recommended as have been proposed for swimming pools. Chlorine and ammonia are undoubtedly more practical of application for large outdoor bathing areas than chlorine alone due to the greater persistence of the chloramines in the water. This probably outweighs the disadvantage of the slower disinfecting action of the chloramines as compared with chlorine. While the possibilities of disinfection methods deserve consideration, unless the future brings forth further developments in the way of attempt to establish bacteriological standards for outdoor bathing places, it appears that emphasis will be laid on the reduction of pollution of outdoor bathing areas rather than on attempt to counteract such pollution by disinfection of bathing waters. The use of disinfecting agencies, however, may be developed particularly to guard against dangers from pollution by bathers themselves in those densely populated bathing areas which are not subject to major water changes through the action of tides and currents.

XXXIV. *Collection of Samples from Outdoor Bathing Places*

Analyses of samples of bathing waters intelligently interpreted are of great value but full consideration should be given to the conditions under which samples are collected and the conditions which may exist at other times. The replenishment of bathing water by stream flow, by tidal action, and by wind and temperature currents, the contamination

introduced by bathers themselves and the intermittency of various sources of sewage pollution, are all of importance. In considering dangers from sewage pollution of bathing areas, it is well to emphasize that time is a factor of great importance. The hazard from a relatively small amount of sewage pollution in close proximity to a bathing area is far greater than a large amount at a considerable distance.

XXXV. *Bacteriological Classification of Bathing Waters*

In the collection of samples from bathing waters in connection with a scheme of relative classification of bathing waters which is subsequently presented, it is suggested that in arriving at a coli-aerogenes count on samples, a simple procedure is to run 4 or 5 dilutions from 10 c.c. down on each sample, in accordance with the expected amount of pollution and to assume 1 *B. coli* originally present in the greatest dilution to give a positive test. For example, positive in 10 c.c. and 1 c.c. and negative in 0.1 and 0.01 c.c. would be called 100 *B. coli* per 100 c.c. Where so-called anomalous results are occasionally obtained such as a sample showing positive in 10 c.c., negative in 1 c.c., and positive in 0.1 c.c., it is suggested that the greatest dilution result be recessed to the next, which in the case illustrated would give 100 *B. coli* per 100 c.c. This is an arbitrary method of computation, open to some mathematical objections, but it is simple and is satisfactory for all practical purposes. On the basis of experience, where a large number of samples has been handled, presumptive tests on lactose broth may be considered sufficient evidence of the presence of *B. coli*, the resulting error as against complete confirmation according to *Standard Methods of Water Analysis* being slight.

XXXVI. *Relative Classification of Bathing Areas Recommended*

In passing on waters of outdoor bathing places, three aids are available: (1) the results of chemical analyses of the water; (2) the results of bacteriological analyses of the water; and (3) information obtained by a sanitary survey of sources of pollution, flow currents, etc. Chemical analyses may in some cases be of value but are not ordinarily delicate enough tests.

It is not considered practicable or desirable to recommend any absolute standard of safety for the waters of outdoor bathing places on any of the three above bases. The arbitrary wholesale condemnation of bathing beaches representing large capital investments is unwarranted without definite epidemiological evidence. A relative scheme of classification of outdoor bathing places appears to offer the most promising program for public health workers to follow. Due to the difference in local conditions surrounding bathing in tidal waters, large and small lakes, and large and small streams, the degrees of classification of the bathing waters in any particular region may of necessity be varied.

In one state, a classification survey of the shore waters was carried out. The entire shore line was divided into sampling stations about 1,000 ft. apart and samples for bacteriological analysis were collected in from 2 to 6 ft. of water at high, low, half ebb, and half flood tides at each station. The results were averaged and adjoining stations combined into sections on the basis of the sanitary survey information. The analytical classification for each section was made by averaging the averages for the included stations. The sections were then classified on the basis of the analyses as follows:

	Average B. Coli per 100 c.c.
Class A	0– 50
Class B	51– 500
Class C	501–1,000
Class D	over 1,000

These same sections were also classified in Classes A, B, C, and D on the basis of sanitary survey information as to sewer outlets, float studies, etc., and final classifications were based on both the analysis and sanitary survey classifications. In the sanitary survey classifications, Class A was considered good; Class D was very poor; and the two intermediate classes ranged from doubtful to poor. Close correlation was obtained between the analysis and sanitary survey classifications.

Proposed bacteriological standards by various agencies have seemed to hit mainly upon two widely divergent limits for standards of acceptability for bathing waters, one of which is 50 *B. coli* per 100 c.c. and the other of which is 1,000 *B. coli* per 100 c.c. It is perhaps reasonable to conclude that, subject to interpretation of analytical studies from proper angles, waters better than the lower limit (1,000 *B. coli* per 100 c.c.) are fairly acceptable. Both these lines of demarcation are drawn in the classification scheme just presented and the committee recommends the use of this classification scheme unless local conditions make some other classification scheme preferable. If it is desired to set up any intermediate classifications, any classification such as "A" can be broken up

into "A+" and "A—". The interpretation of areas falling into Classes B, C, and D as to whether these areas can be considered good, doubtful, poor, or very poor, must for the present be left with the interested state health department or other agency concerned. As further information is gained from the classification of areas, more definite conclusions may be reached. It is emphasized again that final classifications should not be made upon the basis of bacteriological analyses alone but should depend largely on correlative sanitary survey information. Allowances should be made and distinctions drawn as to pollution introduced by large bathing loads at outdoor bathing places and pollution derived from sewer discharges or other sources.

The committee feels that the health board or department of each state should be the guiding agency for state-wide studies of outdoor bathing areas, with the assistance of community and district health units where practicable. Information obtained as a result of classification surveys of bathing waters should be in the hands of public health workers to enable them to furnish intelligent answers to inquiries on the part of the public. While data of this type should be released advisedly so as not to cause unwarranted depreciation of property values near bathing areas, it should serve to acquaint the public with danger spots caused by uncontrolled discharge of sewage and to promote the betterment of health conditions by installation of sewage treatment where necessary for the protection of bathing waters. The recent studies and recommendations of the Tri-State Pollution Commission (New York, New Jersey, and Connecticut) point out what may be done in the way of specifying degrees of treatment for discharge of sewage into waters allocated for recreational purposes.

XXXVII. *Sanitary Appurtenances at Outdoor Bathing Places*

Attention is directed to the need for proper sanitary appurtenances at outdoor bathing places. The remarks in Sections XII and XIII under "Swimming Pools" with regard to dressing rooms, showers, toilets, and lavatory accommodations, are also pertinent as to outdoor bathing places.

NOTE: This 1935 report of the Joint Committee on Bathing Places is presented with the hope that the committee may be advised as to any proposals for alterations and additions to the report. Any such proposals will be given careful consideration and it is intended to await reception of such proposals before recommending the acceptance of the report by the Committee on Research and Standards of the American Public Health Association.

WARREN J. SCOTT, *Chairman*

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PROPOSED STANDARDS *

Bacterial Quality of Swimming Pool Waters

A. Determination of Bacteria Counts.

1. The medium used shall be nutrient agar, prepared according to *The Standard Methods of Water Analysis* of the A.P.H.A.

2. The bacteria count shall be made from plates that have been incubated at 37° C. for 24 hours.

3. Standards. Not more than 10 per cent of the samples covering any considerable period shall contain more than 200 bacteria per c.c.

B. Determination of the Colon-Aerogenes Groups.

* This report was prepared through the collaboration of the Michigan and Detroit Departments of Health and Michigan State College.

1. The method of procedure and media shall be those recommended in the *Standard Methods of Water Analysis* of the A.P.H.A.

2. The standard portion of water for this test shall be 10 c.c. and the standard sample shall consist of five standard portions of 10 c.c. each.

3. All fermentation tubes showing 10 per cent gas shall be confirmed for the coli-aerogenes group by smearing eosin-methylene blue agar plates or transplanting into 2 per cent bile brilliant green broth. Refermentation tests may be made from the eosin-methylene blue agar plates at the discretion of the analyst.

4. Standards. The average colon index for 10 or more consecutive samples shall not exceed one per 100 c.c. of water.

At least 2 samples for bacteriological test should be taken each week.

The residual chlorine test shall be made at the pool side at the time the sample is collected.

All samples shall be tested at the laboratory at the time of bacteriological analysis for residual chlorine as a check against the removal of the chlorine by the sodium thiosulphate at the time of collecting the sample.

The following facts are presented in support of the above recommendations:

Since January 1, 1933, all swimming pool water samples in Detroit have been collected in bottles containing sodium thiosulphate. A total of 11,715 such samples have been examined through August of this year. Of the 11,598 plates examined (37° C. in 24 hours on agar), 749, or 6.5 per cent, had total bacterial counts in excess of 100 per c.c., 618, or 5.3 per cent, were in excess of 200 per c.c. and 316, or 2.7 per cent, were in excess of 1,000 per c.c. Of the 58,575, 10 c.c. portions examined for *E. coli* (partially confirmed by refermentation in 2 per cent bile brilliant green broth), 1,463, or 2.5 per cent, were positive. The average index of *E. coli* was 0.25 per 100 c.c.

Factors Affecting Work Program of Municipal Public Health Engineers*

PUBLIC health officials have never before had the opportunity of obtaining for their communities the valuable and permanent benefits which now are, or may be, made available through the employment of persons on the work relief and social security programs. Where ordinarily the opportunity for study, correlation of data, and research is limited by local budgets and number of employees, there is now available as part of the federal work relief program ample funds and in many cases personnel. Not all of these benefits will come from the extension of present health departmental activities, but may accrue by the encouragement of undertakings by other governmental agencies in their respective fields. The relationship of these various activities either directly or indirectly to the conservation of public health is recognized and appreciated by the trained sanitarian, and he is therefore the logical person to act as a coördinator for the promulgation of such a program.

The public health engineer not only has an unusual opportunity to serve his community directly, but he shares a civic responsibility to see that work relief funds are expended upon projects of maximum benefit. Much valuable data are gathering dust in the archives of our health departments and other governmental agencies because of the lack of local funds and personnel to assemble and correlate them. The construction of sanitary facilities has been curtailed to a minimum because of limited budgets. There exists today an unusual opportunity for developing programs of these types which will be of permanent benefit to public health.

As an aid to public health engineers and a guide to health departments that do not have the services of an engineer, the following list of possible projects is suggested. It is understood that the health departments may not have jurisdiction over some of the activities mentioned, but it is hoped that through their influence and guidance they will be able to encourage other governmental agencies along the lines of endeavor that will bring about permanent improvements in environmental sanitation and thereby create an improvement in the public health.

Construction programs for the extension of water mains and sewers, the erection of water or sewage treatment plants, and the rehabilitation and improvement of public hospital buildings and equipment are examples of major types of improvements that will give permanent health benefits to any community. Such programs may depend upon the ability of the locality to participate in their financing. There are, however, a large number of projects which can be carried on as a part of the work relief program.

The suggested list follows: Surveys embracing such subjects as environmental sanitation, housing, industrial hygiene, faulty plumbing, noise abate-

* Progress Report of the Committee on Municipal Public Health Engineering.

ment, ventilation, air pollution, milk sanitation, bathing facilities, stream pollution, land use surveys, city planning, and provision of recreational facilities, can be conducted. Active campaigns for rat eradication, cutting and pulling of weeds, cleaning of vacant property, mosquito control, adequate dish washing and sterilization, and the demolition of buildings which are unfit for human habitation can be carried on. The assembling and correlating of data relative to nuisances, water supplies, sewers, municipal wastes, and other environmental factors can be undertaken.

In planning any type of program the sponsor is cautioned to check carefully with his local work relief agencies in order to determine that the needed personnel will be available. A program based upon the advance information of the kinds and types of personnel available is more likely to succeed than one in which an attempt is made to adapt an unsuited group to the project.

The committee believes that if these precautions are observed and the work is carried out under the direction of a competent public health engineer, lasting contributions of great value to the health of our people will be achieved through the use of facilities now available.

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Public Health Aspects of Noise Abatement*

RECENT developments in the abatement of urban noise indicate that the movement is based upon the reaction of the general public to noise as a nuisance and to the desire on the part of municipal officials to abate this nuisance. Generally speaking, municipal health departments have not been active in this field, although the public usually registers complaints as to noise or other nuisances with health departments, irrespective of the provisions of local ordinances. Although some publicity campaigns have resulted from the activities of municipal health officials, nevertheless, organized noise abatement campaigns in Europe and this country are usually under the direction of noise abatement commissions especially appointed for the purpose, because of the realization by municipal authorities that noise abatement has many aspects requiring the coördination of the activities of several municipal departments. This is evident when the sources of urban noise are considered.

Noise may be classified in two groups from the standpoint of administrative procedure, namely, the noises unavoidable at present, and those noises which can be controlled or eliminated. The unavoidable noises would be the residual noises remaining even with properly controlled traffic of modern vehicles in satisfactory state of repair, the use of modern building methods, noise hoods or screens around noisy machinery, etc. Any appreciable reduction in this type of noise will have to wait upon advances in engineering design and construction, and the replacement of obsolete noisy equipment when worn out. That such advances are in progress is evidenced by the marked improvement in the modern automobile, which is surprisingly quiet when one considers the power involved. Furthermore, future developments are to be anticipated because of the active interest shown in the reduction of noise by engineers and architects stimulated by the public demand for quiet machines. In fact, the National Standards Association, representing a number of technical organizations, is coördinating the efforts of a number of committees on noise. The present activities of these committees pertain to fundamentals of acoustics, analysis of origin and magnitude of noise, and method of preventing or dampening noise. The practical results, therefore, will be the development of more quiet machinery and sound absorbing building materials, which may be used in general construction to reduce noise to a minimum.

Noises of the second group, namely those which can be avoided by an intelligent and active campaign in noise abatement, have been shown by careful investigation to emanate primarily from traffic sources, especially the operation of elevated railways, street cars, automobiles and trucks in a poor state of repair, and the unnecessary use of the automobile horn and muffler cutouts. On the other hand, many complaints are received as to the noise from the use of radios late at night, the delivery of milk in the early morning hours, and the noisy collection of ashes and garbage. Construction activities are shown to be of minor

* Report of the Committee on Noise.

importance to a municipality as a whole because of the localized nature of noises resulting from building operations, such as riveting. It is gratifying to know that the development of welding processes is likely to supersede riveting and remove this objectionable source of noise from municipalities. Probably the most important advance in the construction field, however, is in the use of sound absorbing materials to dampen unavoidable noise.

The general public is not much concerned with noise as a menace to its health, but merely as a nuisance which should be abated. A number of individuals agree with many members of the medical profession in viewing with alarm the interference of noise with sleep, and the resulting ill effects of nervous strain. The general public, therefore, will support campaigns for noise abatement whether conducted by a noise abatement commission, police departments, or municipal health departments, provided publicity precedes such campaigns.

Generally speaking, municipal health officials are not interested in the abatement of noise because of their absorption in more important public health activities, and because there are no definite data indicating the effect of urban noise upon the mortality and morbidity rates of municipalities. Furthermore, the conclusions of eminent neurologists and physiologists as to the harmful effects of noise, and the fact that there are more than 25 noisy trades where deafness is a common occurrence among the workers, apparently has not convinced many municipal health departments that noise abatement is their immediate concern. Hence the general attitude seems to be that noise abatement is a broad municipal problem with many aspects other than the protection of public health.

Existing ordinances and laws in most municipalities provide administrative procedure for the abatement of noise, provided whole-hearted support is given to the enforcement of such ordinances. Studies by the Noise Abatement Commission of New York City have indicated that the multitude of miscellaneous ordinances of any given municipality are so scattered that administration is very difficult. Furthermore, another stumbling-block in the administration of most of the existing ordinances is that they specify that those producing avoidable and prohibited noises are committing a misdemeanor which is punishable by fines of $100 to $500, or imprisonment of 6 to 12 months. This severe penalty handicaps police officers in the enforcement of petty violations of noise abatement ordinances which, nevertheless, constitute the chief source of urban noise when considered collectively. The New York City Noise Abatement Commission has recommended that the city charter be revised to permit the imposition of so-called administrative fines of $5, and similar action might be warranted in other municipalities.

The procedure under an ordinance permitting the imposition of administrative fines would be for the violator to be handed a notice of his violation by the police officer, sanitary inspector, etc., which would indicate that the violator must pay a $5 fine at the office of the collector of taxes, rather than at a police court, except in those cases when the violator protests his innocence and demands a police court hearing, in which case the usual procedure would be followed. It may be concluded from this very careful study of local procedure required in the abatement of urban noise in a large municipality, that special noise abatement ordinances will greatly facilitate the control of this problem provided the city charter permits of the procedure outlined above.

Little can be accomplished in the

abatement of urban noise unless the general public is educated in the needlessness of most noise, its ill effects, and the possibility of its abatement. It is evident, therefore, that educational campaigns should precede any serious attempt at the control of this problem. Probably the most effective campaign is to acquaint the public through the press and radio as to the effect of noise upon the general well-being of the urban population and the results of investigations as to the origin and magnitude of noise from specified sources, and as to the proposed comprehensive campaign in noise reduction, such as that in progress in New York City, and elsewhere. In this way the coöperation of the public can be secured, and the necessary information obtained as a guide to the progress of the abatement campaign.

A widespread publicity campaign of this nature, and the organization of administrative machinery employing police officers, building inspectors, sanitary inspectors, etc., can be accomplished only through the organization of noise abatement commissions or committees, with active executives to supervise the work. It appears to this committee that sanitary engineers employed by municipal health departments are especially fitted to coöperate actively with noise abatement commissions, and to serve in many cases as the executive officer. In this way the support and influence of municipal health departments can be secured without placing undue stress upon the public health aspects of noise abatement.

The committee recommends, therefore, that those interested in the abatement of urban noise proceed along broad administrative lines through the formation of noise abatement commissions. Due weight must be given to the necessity of active publicity campaigns and the correlation of the activities of many municipal departments and bureaus so that the available administrative personnel will be utilized. Unless this is done the activity will be merely the passing of a general ordinance for lackadaisical enforcement by police departments, after the original interest has waned.

It is felt that the stimulus of an active health department is required to organize such activities and to lend assistance through active coöperation on the part of municipal sanitary engineers and sanitary inspectors. In fact, municipal health departments may have to assume more detailed supervision of such activities in the smaller city through working in close coöperation with police departments. The sanitary engineer in such cases should supervise the collection of technical data and develop control procedures to be followed by the police and other municipal employees. In this way this phase of the control of the environment can be assigned its rightful place with other environmental factors subject to control by those engaged in the field of sanitation and public health.

We respectfully submit this as a final report of the committee, inasmuch as original research by the committee is not possible, thus limiting its endeavor to the appraisal of current developments. It may be anticipated, however, that a critical review of the subject at some future date may be warranted, after the practical aspects of noise abatement have justified definite administrative procedures and have indicated the place of noise abatement in the public health program.

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Recent Developments in Plumbing as Related to Public Health*

OF several recent developments in the field of plumbing, the movement to investigate the health hazards in plumbing of all federal buildings appears to be one of the most significant. Another is the increasing demand for some nationally recognized authority to pass upon the merits of various plumbing fixtures from the health standpoint. The effort by plumbers to inform themselves and the public more fully, as to what is safe in design and practice, has gained momentum and greater scope, aided by their national, state, and local associations. Manufacturers have continued to improve certain fixtures, eliminating features which menace health, and to develop additional protective devices.

In the last United States Congress, Representative John D. Dingell of the 15th Michigan district introduced in the House, and Senator Royal S. Copeland of New York sponsored in the Senate, a joint resolution calling for a survey of the plumbing in all federal buildings to discover defects that might cause disease outbreaks. The resolution was passed by Congress. It now appears probable that the survey will be made under the supervision of the U. S. Public Health Service, with the aid of the Works Project Administration, starting in two cities to develop methods and determine the practicability of extending the survey to all federal buildings. This work will safeguard the health of federal employees and of the public visiting federal buildings, and set an example for owners of other buildings.

Much of the interest attaching to this survey arises from the fact that Mr. Dingell has indicated his intention to follow through, and do everything possible to assure that plumbing health hazards, when discovered in the study, will be promptly removed, and that adequate plan examination before, and supervision during, construction will be provided to prevent new hazards in government buildings.

In the correction of plumbing defects which are hazardous to health, more specific information appears to be needed upon the adequacy and dependability of various devices. This demand has been felt in several quarters and was given expression in a resolution passed at the 1935 annual meeting of the National Association of Master Plumbers.

Some thoroughly competent scientific body having national recognition among public health authorities should secure and make available the pertinent facts, and make recommendations so that a building owner, health officer, or plumber on the job will have something more than his own judgment to guide him. Many decisions relating to plumbing devices have been made by local authorities, to meet the demand for something with which to go ahead. Uniformity would be promoted and confusion minimized by a national set of standards acceptable to all concerned.

During the past year, the public health importance of plumbing has been brought before the industry as perhaps never before. The 1935 convention of the National Association of Master

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* Progress Report of Joint Committee on Plumbing of the Conference of State Sanitary Engineers and the American Public Health Association.

Plumbers last June featured health in an outstanding way upon its program and in the exhibits. Special demonstrations of water contamination by sewage through faulty plumbing were given to groups of master plumbers from all parts of the country. These were made possible through the cooperation of the local Master Plumbers Association, the National Association, the Journeymen Plumbers Union, the manufacturers of plumbing supplies, Mayor Edward J. Kelly, Dr. Herman N. Bundesen, and other city officials of Chicago, where the convention was held. The exhibit of the Wisconsin State Board of Health here has a similar objective. The National Association of Master Plumbers has formed a Public Health Committee upon which the American Public Health Association and other organizations are represented.

Numerous state and local plumbing groups have given particular attention to the subject of water contamination, both at their meetings and in their publications, in order to spread information and stimulate interest. Likewise, the American Society of Tropical Medicine, the Pan-American Medical Association, the Conference of State and Provincial Health Authorities of North America, the American Water Works Association, the American Hospital Association, the Western Branch of the American Public Health Association, and the American Society of Sanitary Engineering, in addition to a number of state and local groups, have given some time on their programs to this subject within the past year. At the American Hospital Association meeting, the members were privileged to witness demonstrations of water contamination caused by plumbing defects through the courtesy of the Board of Education, Department of Health, and Master Plumbers Association of St. Louis.

Experimental plumbing work in many fields by universities, technical colleges, manufacturers, and health departments, or others in charge of plumbing inspection, has been continued with material contributions to the fund of knowledge. Some work relates to health and other studies to water waste, water hammer, corrosion, etc. Unfortunately, the data accumulated have in some instances not been widely broadcast as yet, though in some other cases, such as Wisconsin, valuable bulletins or articles in the trade press have appeared. Such work deserves every encouragement by public health engineers. The Plumbing and Heating Industries Bureau has aided in securing publication of important items on health factors in plumbing, especially in trade and daily papers, and in arranging radio broadcasts on this subject.

There can be reported at this time a growing recognition that it is folly to permit contamination of drinking water in a plumbing system after spending huge sums to prevent pollution at the source or to purify the water. The wide variety of uses for water in any large city, and the complexity of plumbing systems in buildings of considerable size make the safeguarding of drinking water against bacterial and protozoal infections and chemical poisons no easy task. The recent progress and the present development of widespread interest are most encouraging for the future. It is important that the further activities be properly directed, if they are to achieve their maximum usefulness. This necessitates well qualified men who possess not only technical knowledge, but plenty of good common sense.

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Special Problems in Park Sanitation*

THE growing interest in public park areas to preserve points of natural scenic beauty and historic interest, and to furnish camp and picnic grounds for recreational use, has introduced new phases into the familiar problem of camp sanitation. The questions of sanitary practice are much the same as those encountered in tourist camps, but there is a definite difference in administrative control. The extent of the development of this type of recreational areas is evident when you consider the National Parks—51 national monuments, and the 450 state parks that have been created. The national parks extend east and west, north and south over the country, while New York and Texas head the list of state parks with 32 each; Illinois has 30; California 29; and Massachusetts has 24. The other states range from 16 parks down to a single one, while only 3 states—Delaware, Kansas, and Louisiana—do not have any.

Apparently there is need for a general policy to direct the sanitation of recreational environment. A few of the essential points that should be considered in formulating such a policy are suggested by the sub-committee in this brief preliminary report. Glancing back a few years to the early stages of general transcontinental motor vehicle travel, the free tourist camps are called to mind. Every municipality with any pretensions had one. You may remember the insanitary chaos of these vacant lot, free camps, that were established to lure the traveller to spend a few hours and dollars in roadside towns. The lessons learned at that time can well be used in formulating a policy for state and county parks.

The development of each new state or local recreational area imposes an obligation for additional paid service by the governmental body in charge. Parks of this type when established should make adequate provisions for supervision by a paid caretaker whose services will be continuous during the portions of the year the area is in use. The public when at play can scarcely be expected to have more orderly habits than when touring. The continuing success of these parks will largely depend upon their being maintained with sufficient care so that the natural charm is not marred by unsightly collections of debris. The vacationists must continue to have a feeling of unspoiled country.

In the early stages of a movement, communities are apt to be carried away with an idea, losing sight of its practical aspects. Camps in public parks may furnish pleasure for a large number of people of all ages, but they will be enjoyed only so long as they are well maintained. The number of such camps in any area is limited by the state's ability to furnish adequate supervision. Only camps should be permitted that are absolutely necessary to care for the usual holiday crowds, and new ones should not be established until there is a definite public demand.

Organization for maintenance could be modeled on the National Park Service. This may, however, be too elaborate for the less populous states. The

* Preliminary Report of the Sub-Committee on Promotion of Environmental Sanitation.

sanitation of parks and recreational areas should be planned and supervised by the engineering division of the state board of health. The actual construction work and maintenance should be under the jurisdiction of the state park board, if one exists. It may be possible in some instances to have the highway department supervise construction and maintenance. Certainly some established department must be charged with this responsibility. It is difficult to imagine how parks can long exist in active use that are not controlled by a department directly charged with their care. Concessions are a feature of many parks, and in some instances the concessionaire might be required to act as caretaker under the direction of a governmental department.

These concessions may be anything from a hot dog stand at the entrance, to a luxurious hotel, but all of them dispensing food should be regularly inspected.

A uniformity of design for structures planned is desirable, the exteriors being in keeping with the surrounding country. Sewage and garbage disposal plants must not only be planned to afford the usual protection, but they must also be inconspicuous; located where they will mar neither the view nor the pine scented air.

The Civilian Conservation Corps, the Public Works Administration, and the Federal Relief Administration have done such splendid work in developing large park and recreational areas, that it now behooves us to formulate a general policy to govern the sanitation of these areas so that the health of the people using them will be safeguarded. A few of the salient points that may be included in such regulations are listed below:

1. Do not establish a state or local park, recreational area, or camp site without providing for a caretaker.
2. Do not have more camps than are absolutely necessary to care for the usual holiday crowds. Camps should not be established until there is a definite public demand.
3. A small charge should be made to all patrons using camp grounds.
4. Each new development imposes an obligation for additional paid service.
5. There must be an adequate supply of safe, palatable water, provisions for garbage disposal, and conveniently located comfort stations.
6. Concessions should be inspected to guarantee that they are complying with sanitary regulations.
7. Swimming pools and bathing places should comply with the American Public Health Association regulations; and should have a lifeguard on duty.
8. Sanitation should be planned and supervised by the engineering division of the state board of health.
9. Construction work and maintenance should be under the jurisdiction of the state park board or a designated governmental department.

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H. B. HOMMON

Rural Sanitation*

YOUR committee has decided that the advance made in the field of rural sanitation through the utilization of relief labor during the last 2 years is sufficiently outstanding in importance to become the subject of this report of the committee. The chairman has been instructed by the committee to present a brief résumé of accomplishments.

Community sanitation projects were developed in 24 states during the Civil Works Program. In at least 9 of these states it is understood to have been the first intensive program ever undertaken for promotion of the construction of sanitary privies. The maximum number of laborers employed at one time during the C.W.A. program was 35,000. All but 2 of the 24 states continued the program and 8 additional states instituted community sanitation projects with E.R.A. labor. In each of the 8 additional states it is also understood that the inauguration of these projects constituted the first intensive sanitary privy program undertaken.

The popularity of the program is indicated by the fact that W.P.A. community sanitation projects calling for

* Report of the Joint Committee of the Conference of State Sanitary Engineers, the American Society of Agricultural Engineers and the American Public Health Association.

STATES ENGAGED IN THE PROSECUTION OF THE COMMUNITY SANITATION PROGRAM

24 Under C.W.A.	*30 Under E.R.A.*		*39 Under W.P.A.**	
Alabama	Alabama	Missouri	Alabama	Missouri
Arkansas	Arizona	Montana	Arizona	Montana
Delaware	Arkansas	North Carolina	Arkansas	New Mexico
Florida	California	New Mexico	California	North Carolina
Georgia	Florida	North Dakota	Colorado	North Dakota
Illinois	Georgia	Ohio	Delaware	Ohio
Indiana	Illinois	Oklahoma	Florida	Oklahoma
Kansas	Indiana	Oregon	Georgia	Oregon
Kentucky	Iowa	South Carolina	Idaho	Pennsylvania
Louisiana	Kansas	Tennessee	Illinois	South Carolina
Maryland	Kentucky	Texas	Indiana	South Dakota
Michigan	Louisiana	Utah	Iowa	Tennessee
Mississippi	Maryland	Virginia	Kansas	Texas
Missouri	Michigan	Washington	Kentucky	Utah
North Carolina	Mississippi	West Virginia	Louisiana	Virginia
Ohio			Maryland	Washington
Oklahoma			Massachusetts	West Virginia
Pennsylvania			Michigan	Wisconsin
South Carolina			Minnesota	Wyoming
Tennessee			Mississippi	
Texas				
Virginia				
Washington				
West Virginia				

* New Jersey has submitted projects to W.P.A. for approval.

approximately 60,000 laborers have been approved in 39 states.

During the C.W.A. program and through June 30, 1935, the installation of 504,212 sanitary privies has been reported by state health departments. In addition, the following items have been reported: (1) septic tanks, 5,442; (2) privies repaired, 44,680. It is estimated that there will be 3,000,000 sanitary privies constructed under the W.P.A. program.

It is exceedingly fortunate that the Committee on Environmental Sanitation provided standard plans and limiting specifications in its report presented to and adopted by this body in 1932. With the standard thus provided, uniformity in sanitary privy construction practice has been advanced to an extent and with a rapidity that could probably not have been accomplished in any other manner.

The education of the public in the importance of the sanitary disposal of excreta has been advanced many years in this short period. The interest of public health officials, and engineers in particular, has been greatly increased in rural sanitation. In all, approximately 3,000 persons have been engaged in the promotion and supervision of the program. Fully 500 of this number have been engineers. It is believed that the extent to which engineers have participated in the program accounts for the high quality of work accomplished and the advances that have been made in perfecting details of construction.

H. E. MILLER, *Chairman*

Conference of State Sanitary Engineers
H. B. HOMMON
L. M. CLARKSON
V. M. EHLERS

American Public Health Association
JANE H. RIDER
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American Society of Agricultural Engineers
R. W. TRULLINGER
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Shellfish*

LAST year we suggested that the Laboratory Section assist the Public Health Engineering Section in improving methods for the bacteriological examination of shellfish and that such methods include the examination of the entire shell contents. Some of the members of our committee and some of the members of the Laboratory Section committee have done some experimental work during the year employing a modified Eijkman method in an endeavor to find a method of examination which would report only the presence of those organisms in shellfish which were of true fecal origin.

The development of such a method, in our present state of knowledge, would help to remove suspicion from shellfish which under present methods of examination show evidence of high contamination, but which are so far removed from sources of fecal contamination that they could not possibly be affected thereby. The results of this study as carried out by members of our committee were somewhat disappointing. More detailed report on the results of this study will be found in the papers presented at the symposium on shellfish at the Milwaukee meeting of this Association this year.

The results of shellfish cleansing, particularly as applied to hard clams (*Venus mercenaria*) and soft clams (*mya arenarius*) continue to be satisfactory. More rapid progress could be made in this field—as pointed out last year—if a quick, simple, and positive method for disclosing the presence of pathogens in shellfish were available. One of the members of our committee has been engaged in making extended studies of shellfish and water scores aimed towards finding correlations with various factors that might affect the scores. The results of this study will probably be presented at a later time.

In some of the states increased activity in shellfish sanitation surveys and studies has been possible because relief funds were made available.

The further employment of funds for such purposes may make possible the collection of important data bearing upon the cleanliness of shellfish areas and the extent to which domestic and trade wastes may affect such areas.

Efforts to improve our present laboratory method of shellfish examination should be continued in the hope that a more precise and more useful method may be developed so as to make possible a more scientific sanitary control of the shellfish industry than is now possible.

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* Report of the Public Health Engineering Section Committee.

The Application of Limiting Standards of Pollution of Waterways*

THERE is an increasing trend toward the establishment of standards relating to practices and procedures in practically all branches of public health and sanitation. A survey of the activities of the various committees of the Public Health Engineering and other Sections of the American Public Health Association, particularly during the past two decades, clearly shows this tendency both as regards public health administration and methods of technical control. Accordingly, in the preparation of this report of your Committee on Waterways Pollution, it was decided that a summary of the general situation as regards the establishment and application of standards of purity or cleanliness for surface waters would be desirable, with the object of stimulating additional interest in and support for such developmental work in this field as is considered practical. To accomplish this purpose, a review of literature pertinent to the subject was undertaken, such data and information as are obtainable being supplemented by that from correspondence, unpublished reports, and memoranda which were kindly made available to the committee.

It hardly needs mentioning that views on standards applying to pollution were found to be quite varied. Undoubtedly there is much to be learned, and it is an open question whether regulation of waterways pollution in some of its many aspects can or need be placed on such a definite basis as may be interpreted from the term "standards." Yet in certain phases, notably as regards limits of pollution of sources of public water supplies, there appears to be both a reasonable basis and definite need for establishing standards. What is sought in this report is simply to set forth a general survey of the situation and make suggestions relative to future procedure in formulating and putting into effect adequate standards of cleanliness for our water courses.

Many of those called upon to administer anti-pollution laws and regulations are confronted with questions as to the requirements that must be met in safeguarding public interests in our waterways. This has directed attention toward establishment of limiting degrees of pollution or standards of cleanliness for lakes, streams and tidal waters. Attempts to develop standards for general application are known to date back at least to the activities of the Royal Commissions on Rivers Pollution in England, described in reports of the First Commission in 1865, and the Second Commission in 1868, along with reports of succeeding Commissions between 1870 and 1875. In the United States attention was first given to this phase of the general problem of waterways sanitation when in 1872 the Massachusetts Board of Health began a study of sewage disposal and stream pollution in that state, leading to the well known series of investigations at the Lawrence Experiment Station.

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* Progress Report of the Committee on Waterways Pollution of the Public Health Engineering Section.

Since these pioneering efforts to arrive at an understanding of the technical aspects of water pollution and its control, much thought has been given by various authorities to this question of standards. The literature on sanitation includes numerous references covering standards that have been established or proposed for either local or general application in connection with waterways pollution. The underlying fault or shortcoming of a number of those adopted or advocated in the past has been the lack of a sufficiently comprehensive background of properly coordinated scientific information or facts to support the standards if the matter came to a test in the courts or otherwise. The situation is very well expressed in a report for 1934 [1] of the Committee on Research of the Federation of Sewage Works Associations, as follows:

The late Professor William T. Sedgwick was fond of describing standards in sanitation as "devices to save lazy minds the trouble of thinking," which well describes the situation of his day, when a standard was generally no better than a pure guess by one worker easily seized upon, quoted and requoted by others until it assumed the semblance of authority. Something of this same method still remains in certain fields of modern sanitation, but with the development of standards committees in our great national organizations and the consequent critical discussion of current methods, together with the accumulation of scientific data upon which to base these discussions, and a formulation of a joint opinion, standards in the true sense of general agreement of opinion by expert and experienced technicians, are assuming an increasingly important rôle.

Broadly classified, the standards applying to waterways pollution set forth in the literature could be included under one or more of the following headings: those specifying—

1. Certain characteristics for sewage and other effluents that may be permitted to discharge into water courses
2. Dilutions necessary in receiving bodies of water
3. Limiting degrees of water degradation, governed by uses made of the waterways, and defined in units of readily determinable physical, chemical, biological, and bacteriological qualities of the waters

The earlier standards, such as set forth in the reports of the British Royal Commissions on Sewage Disposal and as formulated by Hering, Stearns, Hazen, Goodnough, and others, in specifying the number of cubic feet per second of stream flow required for the inoffensive disposal of sewage contributed per 1,000 population, can be grouped largely under the first two headings. It is evident that these standards were developed with the prevention of nuisances as the primary purpose, rather than the safeguarding of public water supplies.

Developments in recent years would indicate that the trend in standards of waterways pollution is toward the third classification, where all or major uses of the waters are considered. Based largely upon the comprehensive studies of the U. S. Public Health Service, there is now a tendency toward definitely limiting the *B. coli* content allowable in waters usable as sources of public water supply. For instance Jordan [2] states:

The approach to a density limit of sewage organisms in a raw water is definite. Various expressions of this have been made, but none so definite as that of Streeter at the close of his long series of studies of performance of purification plants. Whether or not one agrees with the reasoning, he at least must defend against the indictment the use of any raw water whose average *B. coli* content exceeds 5,000 per 100 ml. It is reasonable to expect that in any future revision, the Treasury Standard limitations will not only be set as they are now upon the quality of finished waters, but also may be suggested as to limiting average *B. coli* index of raw waters.

Two types of standards (1 and 3 of the foregoing classification) are included in the interstate compact proposed by the Tri-State Treaty Com-

mission[3] of New York, New Jersey, and Connecticut for the abatement of pollution of the harbor and coastal waters of the Metropolitan Area of New York City. This included a recommendation that the waters be divided into two general classes, namely, Class A waters, which are used primarily for recreation, shellfish, and culture of fish life; and Class B waters, which are not expected to be used for such recreational and shellfish propagation purposes. The proposed compact also provided that all sewage tributary to Class A waters shall be subjected to a degree of treatment sufficient to remove all floating solids and at least 60 per cent of the suspended solids to effect a reduction of organisms of the *B. coli* group so that the probable number of such organisms shall not exceed 1 per c.c. in more than 50 per cent of the samples of effluent tested by the presumptive method, and to maintain in the general vicinity of the point of discharge at a depth of about 5 feet below the surface of the water a dissolved oxygen content of not less than 50 per cent saturation during any week of the year. Under Class B waters the specified treatment requirements for sewage were such as to secure removal of all floating solids, at least 10 per cent of the suspended solids, avoid formation of sludge banks, and effect a reduction in the oxygen demand of the sewage sufficient to maintain in the general vicinity of the point of discharge a dissolved oxygen content of not less than 30 per cent saturation during any week of the year.

An excellent review of the trends in water pollution standards has been prepared by Streeter,[4] in which he concisely summarizes the present situation as follows:

The older standards, based on fixed dilution ratios, are being superseded by more definite specifications of certain indicators of relative cleanliness, such as bacterial content, dissolved oxygen, oxygen demand, and known toxic chemical substances. Where the public health is involved, limiting standards of bacterial quality, notably with respect to the density of organisms of the *B. coli* group, are becoming of primary importance, though in some instances limitation of chemically toxic substances is almost equally significant. At the present writing a reasonably firm empirical basis exists for the formulation of working standards of pollution for practically all waterways in this country used as sources of public water supply. This should be done in the near future, so as to coördinate efforts in the various states toward a rational and uniform policy in dealing with this problem, especially in its interstate aspects.

A fairly good basis also now exists for the formulation of tentative standards of pollution for shellfish growing areas, and for natural bodies of water utilized for public bathing. In the latter case, however, caution will be necessary in attempting to meet a bathing water standard in some natural waterways subject to noncontrollable pollution by surface drainage water and storm sewage. In some of these instances, at least, the extent of dilution provided would not be sufficient to permit conforming to such a comparatively rigid standard, even if the effect of all the dry-weather sewage entering the waterway were to be removed through adequate treatment.

Where the public health is not involved, the minimum dissolved oxygen standard appears to be the most simple and readily applied one for general application, though a distinct trend toward oxygen "balance" criteria is apparent. Some question remains as to just where the minimum oxygen level should be placed in specific cases, with a strong tendency to fix it at not lower than 3 or 4 p.p.m. and at even higher concentrations in some cases. As organic sludge deposits are particularly harmful to fish life and tend to exert a disproportionately heavy oxygen demand on overlying bodies of water, a definite need exists for standards of sewage and industrial wastes treatment adequately stringent to result in practically eliminating these deposits from all streams and lakes.

Through an inquiry directed to chief sanitary engineers of 25 state departments of health, Streeter found that beyond the U. S. Treasury Department Standard for drinking waters, there are no standards of cleanliness for waters devoted to various uses that

are generally accepted; that where other standards are applied, except as related to limiting degrees of pollution for sources of purified water supplies, these standards are not based on systematic observational data; and that there appears to be a fairly widespread sentiment favorable to the more general use of water quality standards, if they can be based upon such scientific data as to justify their acceptance with every confidence.

Considering the varied uses of waterways, such as for public water supply, watering of stock, industrial water supply, propagation of fish, shellfish, and other aquatic life, recreational purposes, including bathing and boating, navigation, and agricultural development involving irrigation, it is apparent that there is a large task to be performed before this condition for general acceptance of standards can be met. Harmful effects of pollution pertaining to these uses must be properly evaluated and limits defined in suitable physical, chemical, biological, and bacteriological units. The relation one to the other of the various units must be more thoroughly established. This is essential to intelligent application of any general standards to waterways having more than one major use. It is evident that only through the coöperation and careful coördination of results of research conducted by sanitary engineers, laboratory workers, epidemiologists, fish culturists, and many others will it be possible to proceed satisfactorily toward the establishment on a firm scientific foundation of acceptable standards of cleanliness for lakes, streams, and tidal waters.

To facilitate carrying out the necessary research and to provide ways and means for collecting, coördinating, and disseminating the results obtained, it is considered most desirable that some definite agency of the federal government be designated and provided with adequate funds to undertake the task. That the problem is of nation-wide importance is evidenced in many ways, and is recognized in Part III of the *Report of the National Resources Board to the President*,[5] which under the heading of water planning deals with the problems of waterways pollution. As the only comprehensive studies of a scientific nature on waterways pollution performed by the federal government have been conducted by the Office of Stream Pollution Investigations of the U. S. Public Health Service, and as it is believed to be well constituted to carry out the work effectively, your Committee on Waterways Pollution recommends that this Section go on record as urging favorable consideration by the appropriate authorities to the designation of this agency as a national clearing house for research and other activities necessary in the formulation and harmonizing of standards of water quality.

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4. Streeter, H. W. Tendencies in Standards of River and Lake Cleanliness. *Pub. Health Rep.*, 49, 34 (Aug. 24), 1934, pp. 981–992.
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DISCUSSION DEALING WITH LIMITING STANDARDS OF WATERWAYS POLLUTION

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THE subject of limiting standards of pollution for waterways devoted to various uses has been considered for many years, dating back to the work of the Massachusetts Board of Health in the 1880's and of the British Royal Commission on Sewage Disposal in the late 90's. With the recent increase in stream pollution throughout the United States and the growing public consciousness of the problem, interest in this subject has been revived on the part of those sanitary authorities who are faced with the possible institution of extensive stream cleaning programs in the near future. Consideration of this subject by a committee of this Association is, therefore, both timely and profitable.

In connection with a survey of national water resources made during the present year by the Water Resources Section of the National Resources Board, the present situation with respect to the use of water pollution standards in this country was reviewed for the board in a special report prepared by the speaker. A canvass was made of existing practice in the application of such standards in some 25 states, representing a fair cross-section of the country. The results of this canvass, together with a review of recent literature on the subject, have been taken as the basis of the present discussion.

In a general way, the results of the canvass indicated: (1) that aside from the Treasury Department drinking water standard, no standard of quality or cleanliness for waters devoted to various uses has any widespread degree of acceptance among the several states; (2) that other standards, where applied, are diverse in their requirements and with one exception are not based on extensive or systematic observational data; and (3) that with a few exceptions there appears to be a fairly widespread sentiment favoring the more general use of water quality standards, provided that they can be based on a sufficiently firm scientific foundation to justify their general acceptance.

WATER SUPPLY STANDARDS

From a public health viewpoint, the most important phase of the subject has to do with standards of quality for public water supplies and their sources. For domestic water supplies, the present Treasury Department standard has been a widely useful criterion, despite the fact that it was originally intended for application only to drinking and culinary waters supplied by the interstate carriers. With a few minor amendments, principally those designed to eliminate and restrict certain harmful chemical substances not included in the present requirements of the Standard, it can be readily extended as a suitable criterion of safety for all public water supplies. For industrial water supplies, requirements are so variable that no general standard of quality seems to be applicable. Progress in studies of this phase of the subject is being made by the U. S. Geological Survey under the direction of Chief Chemist W. D. Collins and by a subcommittee of the National Water Resources Committee headed by S. T.

Powell, who has made a particular study of boiler waters in this connection.

The matter of limiting standards of pollution for sources of purified domestic water supplies has been studied for a number of years by the U. S. Public Health Service, in connection with its stream pollution investigations. The results of this study, which involved extensive observational surveys of over 30 municipal filtration plants and the operation of a specially constructed experimental filtration plant for about 5 years, have led to the recommendation of a definite limiting standard of pollution for raw waters requiring filtration and for waters requiring only simple chlorination.[1]

For raw waters requiring filtration, the recommended standard would provide: (1) that the average *B. coli* index, when considered over a significantly long period of time, such as a year, should in no case exceed 5,000 per 100 c.c. and (2) that the *B. coli* index on individual days should not exceed 20,000 per 100 c.c. for more than 5 per cent of the same period, in which case the limiting average index might be as high as, or something less than 5,000 per 100 c.c., according to the character of the source and variability of water taken from that source. For waters requiring only chlorination, the average *B. coli* index should not exceed 50 per 100 c.c., or a figure sufficiently lower so that an index of 400 per 100 c.c. would not be exceeded for more than 5 per cent of the time. Both of these standards are based on the assumed production of purified effluents meeting both requirements of the Treasury Department *B. coli* standard. The term "index" may refer either to the Phelps number or to the "most probable number" of *B. coli*.

The standard recommended is now being followed with various modifications by several state health departments in fixing requirements for the quality of sources of purified municipal water supplies. Incidentally, it is the only limiting criterion of water quality thus far developed, which, as far as the speaker knows, is based on extensive and systematic observational data. For general use, it should be amended so as to provide for the restriction of certain harmful and taste producing substances which cannot be effectively removed by ordinary water purification processes.

Among other water quality standards having a more or less direct bearing on the public health are those which have to do with recreational uses of waterways, such as bathing and fishing, with certain agricultural uses, notably stock watering and irrigation of food crops intended for human consumption, and with the maintenance of general cleanliness and freedom from "nuisance" in streams, which is closely related to the suitability of bordering land areas for healthful dwelling places.

In the several fields of application of these standards, wide divergences in opinion and practice are found among the various states. This is particularly true of bathing water standards, which range from a limiting *B. coli* index as low as 50 per 100 c.c. to one as high as 1,000 per 100 c.c. Minimum dissolved oxygen requirements for the maintenance of aquatic life also show quite a diversity, varying from as low as 2.0 to 5.0 p.p.m. or more. Some fish experts, notably Dr. Hubbs of Michigan, hold that no definite dissolved oxygen minimum can be set, as the killing limit varies with temperature and various constituents of sewage have different effects on fish. Hubbs expresses a preference for an oxygen reserve standard, in which a fixed excess of dissolved oxygen over oxygen demand is specified, such as, for example, 3 p.p.m.

Standards of cleanliness for waters used in agriculture have been adopted in only a few of our states, notably in California, Colorado, Maryland, and the southwestern group. For irrigation waters applied to edible vegetable crops, the most definite standard is in Colorado, where such waters must not contain more than 1,000 coli-aerogenes bacteria per 100 c.c. Opinions vary widely as to the quality requirements of waters used for stock watering. At one end of the scale is the view that domestic cattle should be served only with water fit for human consumption. At the other end is the view that harmful effects of sewage on cattle are slight unless it contains chemical poisons or affects the protein intake of food. In Maryland, sewage entering streams used for stock watering must be chlorinated.

The history of efforts to set up standards of general cleanliness for polluted bodies of water extends back over a period of more than 25 years to the formulation of the British Royal Commission standard for sewage effluents and the various dilution standards recommended for use in the United States. Among the 25 states recently canvassed, only 4 have any definite standards in this respect, though several other local standards have been proposed in recent years. Among these is the standard suggested by Howson and Burdick for the Illinois River, in which the minimum dissolved oxygen content would be not less than 3 p.p.m. nor less than the 5 day biochemical oxygen demand at 20° C. This is similar in principle to the reserve oxygen, or "fish zero" standard proposed by Hubbs. Another recent standard set up for localized application is that of the Tri-State Pollution Commission for waters bordering the greater New York metropolitan area. This standard divides the waters into two classes, A and B, with considerably higher requirements for Class A than for Class B, the former being set aside for bathing and other recreational purposes. For Class A waters, among other requirements, the *B. coli* index is limited to 50 per 100 c.c., and the dissolved oxygen minimum to 50 per cent of saturation. For Class B, the oxygen minimum may be as low as 30 per cent of saturation.

Although it is possible that no fixed standards of the kind would be generally applicable to all classes of waters, there seem to be certain basic requirements that are common to all waters where freedom from "nuisance" conditions and their utilization for recreational purposes are desired. One requirement is the removal of all, or practically all, of the settleable organic solids from sewage and industrial wastes discharged into such waters, in order to prevent the formation of sludge deposits, which are detrimental to normal stream life. It is also agreed that for the prevention of "nuisance" or other undesirable conditions, the dissolved oxygen content should not fall below a certain minimum, and a favorable "oxygen balance" should be maintained. The precise location of these optima to meet the conditions of various uses of waterways still remain to be defined, in so far as their general acceptability is concerned.

In addition to these basic requirements, are others to be considered, notably with respect to the freedom of waters from biological growths resulting from the discharge of sewage and sewage effluents, the presence of certain toxic substances detrimental to maintaining a normal biological equilibrium in natural bodies of water and possible effects of oils and tarry substances on the natural life and purification capacity of these waters and their normal use by riparian dwellers.

The present status of water pollu-

tion standards and their application in this country may be summed up very briefly as follows: The use of such standards has been limited thus far to a comparatively few states and has been marked by a general lack of agreement as to their specific requirements for particular kinds of water utilization. As the result of the virtually unrestricted pollution of our waterway systems which has been permitted in the past, conditions in many of these waterways have become so serious that demands for their relief are becoming increasingly widespread and insistent. If these measures are to be both effective and economical, they should be planned and executed with a view to meeting definite limiting standards of pollution, fixed according to the requirements of each major water use involved and based on a scientific study of these requirements.

At the present writing, aside from the Treasury Department drinking water standard, which has become established as a reasonably safe criterion through long and wide experience, none of the standards mentioned in connection with this discussion has at present any widespread degree of acceptability or actual use. Of these other standards, only one, so far as is known to the speaker, has been recommended as the result of any systematic and comprehensive observational study. At the same time, virtually all of these standards are of such a nature that, once established on a scientific basis, they should be capable of fairly general applicability, because they have to do with water quality requirements which are common to all individuals and practically all situations of a given class. It is hardly conceivable, for example, that safety requirements for drinking or bathing waters would vary to any appreciable extent among several groups of individuals, wherever they might be located, or that the essential subsistence requirements for given species of fish or other aquatic life would vary widely in different bodies of water.

The present need, then, seems to be that some public health research agency experienced in water pollution problems and having at its command the necessary personnel and working funds, undertake a thorough study of the limiting requirements to be met for various kinds of water use, with a view to recommending standards based on such requirements. A study of this kind, if adequately planned and financed, would reveal more definitely the stronger and weaker points of standards now in use and would inevitably lead to their improvement and adaption for wider application. This general method of approach seems to be greatly needed at present in considering the question of water pollution standards, which too often in the past have depended on individual opinions backed by inadequate supporting data. If this Section of the American Public Health Association can lend its aid toward such an effort, it will be rendering a notable service to the cause of intelligent waterways pollution control in this country. The action of your committee in bringing the matter up for discussion at this time is most commendable.

REFERENCE

1. *J. Am. W. W. Assn.*, Sept., 1935, pp. 110–119.

To Study Nursing Service in State Departments of Health*

THE Committee to Study Nursing Services in State Departments of Health was set up as a joint committee because the work followed a study of State Nursing Services made by the National Organization for Public Health Nursing in 1931 and also because the question involved represented the interest of both groups. A large part of the statistical service has been given by Anna Miller, of the National Organization for Public Health Nursing staff, and without such valuable help the committee could not have functioned effectively.

The committee conceived its broad purpose to be the strengthening of nursing service in state departments of health. Its more immediate objectives were defined as three:

1. Collection of facts regarding the organization functions and practices in state nursing in the several states
2. Study of the collected data
3. Interpretation of the findings to determine whether the different situations offer comparable problems which may have some solution through the formulation of fundamental principles in the organizing and functioning of state nursing services

COLLECTION OF FACTS

Facts were collected through the medium of a questionnaire which included in its scope only such items as dealt with organization, functions, and methods. This limitation as to scope seemed desirable in order not to duplicate effort, because another joint committee to study personnel practices in states had its plans well under way. The two committees cleared plans and decided to exchange information. The questionnaire of this committee was sent to the 48 states and, in addition, to the District of Columbia and to Hawaii. All but three states, Delaware, Colorado, and South Carolina, returned the questionnaires.

The information received has been tabulated and obvious inconsistencies have been checked through correspondence. The data now available are sufficiently accurate and complete for the general purposes of the committee; but if the information were to be summarized by states following the form of the National Organization for Public Health Nursing study of 1931, the summary should very obviously be submitted to each state for final checking and approval. At the present time, the committee does not believe that such a specific summary is indicated, although a comprehensive summary of the answers to each item contained in the questionnaire might easily be prepared for distribution to the states which participated in the study. Several states indicated their interest in a complete report of work in other states so identifying information may have its value.

STUDY OF DATA

The information collected was carefully studied by the separate members of the committee and finally in meeting. It is considered significant that the interest of the committee increased during the 3 hour conference which was held just before the Annual Con-

* Report of the Joint Committee of the National Organization for Public Health Nursing and the American Public Health Association.

ference of the American Public Health Association in Milwaukee. The committee was unanimous in its belief that the study offered many possibilities which had not been thoroughly sounded. Sufficient refinement of the tabulation has not been made to include in this report a summary of the statistical information upon which the tentative conclusions of the committee are based. It is hoped that the following general statement will be accepted before the complete report is offered:

There are striking similarities in concept of function and in the concrete problems as outlined by the various states; on the other hand, there are wide divergencies in organization and in the methods by which similar problems are met. These factors offer great opportunity for further productive study. It is upon this tentative generalization based on the study of factual information that the committee offers its present conclusions:

1. The major problems seem to point to those of organization, budget, and personnel and are therefore administrative in character.
2. From the evidence at hand, there is a similarity in purpose in relation to public health nursing in several states to justify further study as to fundamentals in organization, functions, and methods.
3. The committee recommends the continuation of the study with the thought that the work ought to be continued in coöperation with the Nursing Committee of the Committee on Administrative Practice.

MARION SHEAHAN, *Chairman*
MARGARET EAST
OLIVIA PETERSON
PEARL McIVER (*ex officio*)
ALMA HAUPT,
Representing N.O.P.H.N.

Accident Statistics

IN the absence of the Chairman, no formal report of the Committee on Accident Statistics was presented at the annual meeting in Milwaukee. The Chairman of the committee presented by letter a statement reviewing the past work of the committee, its inactivity during the past year, and a statement of possible problems that the committee should consider in the future.

It was suggested that the committee continue its previous promotion of the collection of supplemental data on fatal accidents by official departments of health and to continue its coöperation with non-official agencies such as the National Safety Council and the American Museum of Safety in the collection of accident statistics. The statement of the Chairman referred to the many agencies in the federal government that were collecting statistics on one or another kind of accidents but that no single federal agency is responsible for putting these data together. Dr. Louis I. Dublin recommended that the Vital Statistics Division of the Federal Bureau of the Census consider as one of its major responsibilities the publication of complete annual statistics of accidents. He referred to the excellent work of Dr. Earle G. Brown of Kansas in analyzing data available on fatal accidents in Kansas.

The Section referred the statement of the Chairman to the Section Council which decided to continue the committee appointing a new chairman to take the place of Dr. Fales who had requested to be relieved of the chairmanship because of lack of time to carry on the work of the committee.

W. THURBER FALES, *Chairman*
GEORGE H. VAN BUREN
J. V. DE PORTE
T. F. MURPHY
EARLE G. BROWN
I. C. PLUMMER
R. A. FORNEY, *Consultant*

Accuracy of Certified Causes of Death

THE report of the Committee on Accuracy of Certified Causes of Death and Its Relation to Mortality Statistics and to the International List was approved, in principle, by the Section on Vital Statistics of the American Public Health Association, at its meeting in Milwaukee, Wis., in October, 1935.

This report presents the committee's recommendations as to—(a) what titles of the present (Fourth) revision of the *International List of Causes of Death* should remain therein; (b) what terms should be listed under each title; (c) what terms should be transferred from one title to another. The full report was published in the *Public Health Reports*, September 13, 1935, and will appear as *Reprint No. 1706* from the *Public Health Reports*.

HAVEN EMERSON, *Chairman*

Stillbirths*

THE conclusions and recommendations of the Sub-committee on Stillbirths are offered for consideration of the Section on Vital Statistics for discussion before submission to the Committee on Research and Standards.

On approval by the latter standing committee of the Association, the Committee on Accuracy of Certified Causes of Death will represent the Association in conferences in this country and in Europe in preparation for the revision of the *International List of Causes of Death* which is planned for 1938 in Paris.

Before we can hope effectively to reduce the fetal and maternal losses, we must have adequate information with regard to the magnitude of the problem, the variations in prevalence, and the underlying fetal and maternal conditions associated with stillbirth mortality. The information is within the possibilities of statistical tabulation and analysis. Completeness of registration, comparability of original records, and uniformity in the use of terms and in registration practice are prerequisites.

Stillbirth registration is recognized as grossly incomplete in practically all sections of the country. Glaring lack of uniformity is found in the minimum period of uterogestation for which stillbirth registration is required. Variation also exists in the evidence of life used to distinguish between live and stillbirths; for although most states use the American Public Health Association rule No. 19 of Statistical Practice as amended in 1913, few have included it in recent instructions to certifying physicians. There is not in common use a list of causes, maternal and fetal, ante- and intra-partum, which lead to the occurrence of stillbirths.

To remedy these defects your committee recommends: Active stimulation of the registration of stillbirths, both as separate projects and in connection with campaigns for the improvement of registration of live births; the promotion of uniform state laws and regulations with regard to the minimum period of uterogestation to be used for recording, and the evidence of life to be used in distinguishing between live and stillbirths. Your committee also recommends the approval by the Section on Vital Statistics and by the Association, on recommendation of the Committee on Research and Standards, of a form of certificate of fetal death, and a list of terms to be used as a basis of a table of stillbirths by cause to be included in the annual report on Birth, Stillbirth, and Infant Mortality Statistics of the U. S. Bureau of the Census, and to be published by the states and by the larger cities in their annual reports. It also recommends that the *Physician's Pocket Reference* to the *International List of Causes of Death* issued by the Bureau of the Census be expanded to include a section on stillbirths which will emphasize the importance of stillbirth registration, give the definition of stillbirth, and the evidence of life to be used in distinguishing between live and stillbirths as recommended by the American Public Health Association in Rule 19, 1908,

* Report of the Sub-Committee on Stillbirths of the Committee on Accuracy of Certified Causes of Death. This report is presented for discussion prior to its adoption.

and the resolution of 1913, together with a list of fetal and maternal causes of stillbirth.

The following five matters were considered by the Sub-committee on Stillbirths to require clarification and formal agreement for purposes of public declaration of policy by the public health profession as represented in the American Public Health Association:

A. Definition of live and stillbirths
B. Elements of a uniform state law requiring the reporting of stillbirths
C. A standard certificate of stillbirth
D. A list of causes of stillbirth, whether determined in the fetus or related to conditions in the mother
E. Joint Cause Practice for the assignment of stillbirths

A.

Your committee wishes to call attention to the excellence in matter and form of the Report of a Committee on Definition of Stillbirth submitted to this Section in 1927 by Drs. Henry B. Hemenway, William H. Davis and Charles V. Chapin, which refers to correspondence in the Census Bureau by Dr. Cressy L. Wilbur in 1907, and with approval to No. 19 of Rules of Statistical Practice adopted by the Section on Vital Statistics of the A.P.H.A. in 1908, which reads as follows:

No child that shows any evidence of life after birth should be registered as a stillbirth.

In 1913 the following resolution was adopted by the Section on Vital Statistics:

Resolved, that the present Rules of Statistical Practice relating to stillbirths and premature births as adopted by the American Public Health Association in 1908, should be strictly followed by American registration offices, it being understood that the words *any evidence of life* in Rule No. 19 should include action of heart, breathing, movement of voluntary muscle.

It was further noted in this report of 1927 that,

So far as is known to the members of this committee, American statistical offices have been strictly observing this rule as amended by the resolution, except that the Province of Quebec has determined the fact of life after birth solely by the act of breathing.

The report of 1927 (Hemenway, Davis, and Chapin) considers in detail a communication from the Health Section of the League of Nations dated April 1, 1925, and refers with approval to No. 16 of the Rules of Statistical Practice (1908) which reads as follows:

Statement of viability or non-viability of an infant prematurely born shall not be considered in classifications.

The report further correctly states with admirable brevity that

The term stillbirth or deadbirth has universally been recognized as meaning dead at the moment of birth. Death means absence of life. As generally recognized the status of fetus terminates at birth, provided that the organism is alive at time of birth. Life of an animal is shown by heart beat, respiration or movement of voluntary muscle. This is general, and it applies to adults as well as to newborn children.

The report concludes with the recommendation that the existing rules of statistical practice regarding stillbirths be reaffirmed.

Rule No. 4 (4, 1908)—Stillbirths should not be included in deaths.

Rules No. 5 (5, 1908)—Children born alive and *living for any time whatever*, no matter how brief, after birth, should not be classed as stillbirths, even though reported by the attending physicians or midwives as "stillborn."

Rule No. 6 (6, 1908)—Wherever age, in days, hours or minutes, is reported for a "stillborn" child, or indicated by a difference between dates of birth and death, the registrar should secure a statement that will enable the case to be classified with certainty either as a stillbirth or as a death. If no additional information can be obtained, the statement of age should govern, and the case be compiled as a death, not as a stillbirth.

Rule No. 17 (17, 1908)—For registration purposes, stillbirths should include all children born who do not live any time whatever, no matter how brief, after birth.

C.

STANDARD CERTIFICATE OF STILLBIRTH
(See instructions on reverse side)

State File No. ______
Registered No. ______

1. PLACE OF BIRTH
County ______ State ______
Township ______ or Village ______
City ______ No. ______ St., ______ Ward
(If birth occurred in a hospital or institution, give its NAME instead of street and number)

How long has mother lived in this city or town, immediately prior to this birth ______ yrs. ______ mos. ______ days. How long in U. S., if of foreign birth ______ yrs. ______ mos. ______ days

2. Full name of child ______

3. Sex	If plural births (4. Twin, triplet, or other ______ (5. Number, in order of birth ______	6. Premature ______ Full term ______	7. Legitimate ______	8. Date of birth ______, 19 ______ (Month, day, year)

FATHER	MOTHER
9. Full name ______	18. Full maiden name ______
10. Residence (usual place of abode) (If nonresident, give place and State) ______	19. Residence (usual place of abode) (If nonresident, give place and State) ______
11. Color or race ______ 12. Age at last birthday ______ (years)	20. Color or race ______ 21. Age at last birthday ______ (years)
13. Birthplace (city or place) ______ (State or country) ______	22. Birthplace (city or place) ______ (State or country) ______
OCCUPATION 14. Trade, profession, or particular kind of work done, as spinner, sawyer, bookkeeper, etc. ______	OCCUPATION 23. Trade, profession, or particular kind of work done, as housekeeper, typist, nurse, clerk, etc. ______
15. Industry or business in which work was done, as silk mill, sawmill, bank, etc. ______	24. Industry or business in which work was done, as own home, lawyer's office, silk mill, etc. ______
16. Date (month and year) last engaged in this work ______, 19 ______ 17. Total time (years) spent in this work ______	25. Date (month and year) last engaged in this work ______, 19 ______ 26. Total time (years) spent in this work ______

27. Number of children of this mother (at time of this birth and including this child) ______ (a) Born alive and now living ______ (b) Born alive but now dead ______ (c) Stillborn ______

MEDICAL CERTIFICATE - CONFIDENTIAL

28. Period of gestation ______ (weeks) 29. Was labor induced mechanically ______ Total duration of labor ______ (hours)
(Include rupture of membranes, bag, bougie, and packings)

30. Was there an operation for delivery ______ Name of operation ______ Did operation precede fetal death ______
(Include low, mid, and high forceps; version and extraction; breech delivery; Cesarean; and craniotomy and other mutilating operations)

31. State the drugs and anesthetics given during labor and delivery ______

32. Did fetal death occur before labor ______ During labor ______ 33. Was the fetus macerated ______

34. Cause of stillbirth (a) Fetal ______
(See reverse side)
(b) Maternal ______

CERTIFICATE OF ATTENDING PHYSICIAN OR MIDWIFE

I hereby certify that I attended the birth of this child, who was stillborn at ______ M. on the date above stated.

(When there was no attending physician (or midwife, then the father, householder, (etc., should make this return)

(Signed) ______, M.D.
or ______ Midwife
Address ______

Filed ______ 19 ______ ______
Registrar

D.

UNITED STATES STANDARD CERTIFICATE OF STILLBIRTH

Definition of a stillbirth.—A stillborn child is one which shows no evidence of life after complete birth (no breathing, no action of heart, no movement of voluntary muscle). Birth is considered complete when the child is altogether (head, trunk, and extremities) outside the body of the mother even if the cord is uncut and the placenta still attached.

Why stillbirths should be registered.—Registration of all stillbirths is important: FIRST, on account of the great loss of human life occurring in the prenatal and natal periods; SECOND, on account of the relationship between fetal deaths and maternal mortality and morbidity. Although it is often impossible to determine the exact cause of fetal death, information regarding the associated conditions will lead the way to lowering the high fetal and maternal mortality. Important causes and associated conditions frequently found are shown below.

Instructions re Inq. 34. Cause of stillbirth (a) Fetal (b) Maternal.—Describe fully the conditions in the fetus and mother which were associated with the fetal death—i.e., conditions found in the fetus at the time of birth and diseases and conditions of the mother during pregnancy and labor. Indicate the condition you consider the primary cause of the fetal death. For example: The dead fetus was hydrocephalic; the mother had had a mild case of toxemia during pregnancy; the fetus would probably have been live born except for the hydrocephalus. Enter under Inq. 34: (a) Fetal—"Hydrocephalus—primary." (b) Maternal—"Toxemia."

CAUSES OF STILLBIRTH

A. CAUSES DETERMINED IN THE FETUS

1. Infection
   a. Syphilis
   b. Sepsis
   c. Other infections

2. Asphyxia
   a. Separation of placenta
   b. Abnormalities of cord
   c. Other causes of asphyxia

3. Congenital malformations
   a. Hydrocephalus
   b. Anencephalus
   c. Spina bifida and meningocele
   d. Malformations of heart
   e. Other

4. Birth injury
   a. Malpresentations
   b. Difficult labor
   c. Other causes of physical injury of the fetus

5. Other diseases or conditions affecting the fetus primarily

6. Cause unknown

B. CAUSES AND CONDITIONS IN THE MOTHER ASSOCIATED WITH THE FETAL DEATH

1. Infectious and parasitic diseases
   a. Influenza
   b. Tuberculosis
   c. Syphilis
   d. Other

2. Cancers and other tumors
   a. Malignant and other tumors of the female genital organs
   b. Malignant and other tumors of other organs

3. Rheumatic, nutritional, endocrine, and other general diseases
   a. Acute rheumatic fever
   b. Diabetes
   c. Diseases of the thyroid and parathyroid glands
   d. Other

4. Diseases of the blood and blood-making organs
   a. Pernicious anemia
   b. Other

5. Chronic poisonings and intoxications
   a. Alcoholism
   b. Lead poisonings
   c. Other

6. Diseases of the nervous system and organs of special sense
   a. Psychosis
   b. Epilepsy
   c. Other

7. Diseases of the circulatory system
   a. Diseases of heart
   b. Diseases of arteries

8. Diseases of the respiratory system
   a. Bronchitis
   b. Pneumonia
   c. Other

9. Diseases of the digestive system
   a. Diseases of liver—specify
   b. Appendicitis
   c. Hernia, intestinal obstruction
   d. Other

10. Diseases of the genitourinary system—known to have preceded pregnancy
    a. Nephritis
    b. Other

11. Diseases of pregnancy and childbirth
    a. Sepsis—observed before delivery
    b. Albuminuria, eclampsia, and pyelitis
    c. Other toxemias—specify with or without convulsions
    d. Hemorrhages, ante-and intrapartum, due to placental abnormalities and other conditions
    e. Ectopic gestation
    f. Other accidents of pregnancy and childbirth—specify

12. Operations other than for delivery—specify

13. Conditions of the bones interfering with normal labor

14. External causes
    a. Traumatism—blow, fall, shock, etc.
    b. Overwork
    c. Other—specify

15. Other diseases and conditions of the mother—specify

16. Cause unknown

U. S. GOVERNMENT PRINTING OFFICE

Rule No. 18 (18, 1908)—Birth (completion of birth) is the instant of complete separation of the entire body (not body in the restricted sense of trunk but the entire organism, including head, trunk, and limbs) of the child from the body of the mother. The umbilical cord need not be cut or the placenta detached in order to constitute complete birth for registration purposes. A child dead or dying a moment, no matter how brief, *after* birth, was a living child, and should not be registered as a stillbirth.

Rule No. 19 (19, 1908)—No child that shows any evidence of life after birth should be registered as a stillbirth.

Rule No. 20 (20, 1908)—Stillbirths should not be included in tables of births or in tables of deaths. They should be given in separate tables of stillbirths.

Rule No. 21 (21, 1908)—It is not desirable that midwives be permitted to sign certificates of stillbirths.

Rule No. 22 (22, 1908)—Total births should include children born alive only, and headings of tables should state that stillbirths are excluded.

Rule No. 23 (23, 1908)—Whenever, under foregoing rules, a death should be registered, there should be a corresponding registration at some previous time of a birth; and whenever a stillbirth is registered it should be rigorously excluded from both the statistics of births and deaths.

The sub-committee at present reporting endorses each of the above rules of statistical practice as adopted by the Section on Vital Statistics in 1908.

While it is rare for a product of pregnancy of less than 28 weeks gestation to present evidence of life after complete birth (*i.e.*, action of heart, breathing, movement of voluntary muscle), such instances seem to be of undoubted authenticity and when this does occur it is worthy of special medical record and supporting comment. Under Rule 19, 1908, as amended in 1913, such products are, of course, registered as live births. The committee recommends that the information with regard to period of gestation be noted on the live birth certificate and the supporting comment be made a matter of special confidential record for medical purposes.

Unless gestation has advanced to the 5th month, *i.e.*, after 120 days, the product of pregnancy need not be reported as a stillbirth.

The term *abortion* should be reserved for the expulsion or extraction of the product of conception previous to its presumed viability, usually understood to apply to a fetus of less than 28 weeks from the assumed date of conception (6½ calendar, or 7 lunar months, at which time, in the races prevailing in the United States, the fetus will weigh 1,500 grams or 3¼ pounds and have a length of 35 centimeters or 14 inches).

The term *early abortion* should be applied only to expulsion or extraction of the product of conception prior to the end of the first 12 weeks of pregnancy.

The term *late abortion* should be applied to expulsion or extraction of the product of conception from the end of the twelfth week, or after development of the placenta and up to the 28th week of pregnancy.

The term *premature labor* should apply to the delivery of a fetus capable of surviving, and as usually understood, but not absolutely limited in fact, to apply to the product of conception after 28 weeks or 6½ calendar months or seven lunar months, which in American experience will usually have a weight of 1,500 grams or 3¼ pounds and a length of 35 centimeters or 14 inches.

B.

While the value to science and to society of an exact knowledge of all pregnancies, their duration prior to interruption, at any time prior to term can be logically maintained, nevertheless we believe practical considerations and the weight of administrative procedures and professional traditions are of such strength as to justify us in planning for and promoting registration

of only such stillbirths as are estimated to represent products of conception of 20 weeks' duration or more. This is the period recommended in the model birth registration law.

It is recommended that the influence of the American Public Health Association be exerted in all proper ways to bring concerted action of appropriate professional bodies and other organizations, so that state legislatures may be persuaded to enact new laws or amend existing statutes to require the registration of stillbirths, uniformly defined and by the use of a form approved by the Bureau of the Census for this purpose, and by the use of an approved list of terms describing the cause of the stillbirth comparable as far as practicable with the *International List of Causes of Death,* and that to this end the following organizations be approached for coöperative action in the matter—

U. S. Bureau of the Census
U. S. Public Health Service
Children's Bureau
State and Territorial Health Officers
Conference of State and Provincial Health Authorities of North America
American Medical Association (Sections on Obstetrics, Gynecology, Pediatrics, Preventive and Industrial Medicine, and Public Health)
American Academy of Pediatrics
Association of American Obstetricians and Gynecologists
Association of State Registrars
National Conference on Commissioners on Uniform State Laws
Life Insurance Companies

C. and D.

The text of the face of a suggested standard stillbirth certificate (C), with a list of approved causes of stillbirth printed on the back or reverse (D), is recommended.

E.

Your committee is eager for suggestions regarding this proposed certificate from all the members of the American Public Health Association who are interested in the registration of stillbirths. We believe, in many instances, two or more causes will be simultaneously reported on these certificates and that a manual of joint causes for stillbirths will be needed. No recommendations of a more exact nature are offered on this subject at present except that the experience of selected lying-in hospitals and a few cities be studied systematically to determine the general usefulness of the certificate, the types of causes which are reported, the extent of joint cause reporting, and the most practical means of encouraging uniformity in the practice of registration officials. Following the special studies mentioned above it will be feasible to prepare detailed instructions for certifying causes of stillbirth, and a list of undesirable terms. For the present the committee recommends that the instructions be limited to those shown on the back of the present form as follows:

Describe fully the conditions in the fetus and mother which were associated with the fetal death, *i.e.,* conditions found in the fetus at the time of birth and diseases and conditions of the mother during pregnancy and labor. Indicate the condition you consider the primary cause of the fetal death. For example: the dead fetus was hydrocephalic; the mother had had a mild case of toxemia during pregnancy; the fetus would probably have been live born except for hydrocephalus. Enter under item 34: (a) Fetal—Hydrocephalus—primary. (b) Maternal—Toxemia.

HAVEN EMERSON, *Chairman*
F. L. ADAIR
ETHEL C. DUNHAM
D. A. D'ESOPO
ELIZABETH C. TANDY

Confidential Inquiry Into Cause of Death

TWO years ago, a report was presented at a meeting of this Section on an experiment made in the Westchester County Health District to determine, first, the inaccuracy present under the existing system of death registration in the statement of two causes of death (namely, syphilis and alcoholism), and second, the reaction of the general medical profession to the use of a confidential form of death certificate. This experiment consisted of interviewing personally a group of 350 physicians, each of whom reviewed all of the death certificates he had signed during a period of 2 years and stated confidentially in which cases alcoholism or syphilis had been a leading or contributory cause of death. The investigator, a physician from the health department, also discussed with each doctor in the group the whole question of whether or not a confidential form of death certificate would result in greater accuracy than can be attained under the existing system. The results may be summarized as follows:

1. Additional data secured confidentially by personal visit for 5,299 deaths resulted in a death rate from syphilis approximately double the original recorded mortality from this cause and a corrected figure for alcoholism 57 per cent higher than the recorded rate. Syphilis was stated on the original certificate in approximately 49 per cent of the cases in which it should have been so certified, and alcoholism in 33 per cent.

2. Practically all of the 365 physicians reporting deaths in the Westchester County Health District during a 2 year period felt that confidential reporting would result in far greater accuracy in the statement of causes of death than does the present official system.

In view of these results and the apparent enthusiasm of the group of physicians concerned, it was decided to follow this experiment immediately with another. This second had as its major object to set up, if possible, a system of voluntary confidential reporting of causes of death. To this end a form was designed which allowed space for a confidential statement of the primary and contributory causes of death. A detachable part of the form which was finally accepted by the County Medical Society contained identifying information, specifically the date and place of death and the cause of death stated on the original certificate. In no place was the name of either the patient or the physician included. Although date and place of death was sufficient information to locate the official death certificate on record in the county office for comparison, the fact that the County Medical Society earlier rejected a form containing on the detachable section the name of the decedent in addition to the place and date of death would make it appear that physicians believed that they were not identifying their patients. Every effort was made to make it clear that the confidential statement could and would be checked with death certificates but that once this was done the identifying data would be detached from the rest of the blank and destroyed.

A number of blank forms and stamped return envelopes were supplied to every physician in the district with the request that one be made out and mailed to the County Commissioner

CONFIDENTIAL STATEMENT

Place of Death ....

Date of Death ....

Certified Cause of Death ....

....

Note: This section is to be used only for determining that a confidential report is filed for every death. It will be detached immediately from the lower section and destroyed.

Cause of Death (Confidential Statement)

Contributory Causes (Confidential Statement)

Autopsy Findings—If Any (Confidential)

Note: This section is strictly confidential and will be used only for statistical purposes, and promptly destroyed.

Mail to the Westchester County Commissioner of Health, 148 Martine Avenue, White Plains, as soon as possible after the standard certificate of death is filed with the Registrar.

of Health for every death certificate signed, regardless of whether or not there was any additional confidential information to be given. The project thus roughly described was endorsed by the County Medical Society both through letters to each individual physician and through a notice published in the society's monthly bulletin.

The results were frankly a failure. For the first 2 months after the forms were sent out approximately one-third of the recorded deaths were also reported on confidential blanks. After that only a group of a dozen physicians continued to make reports, and the number of their deaths was negligible. Obviously to fill out and mail routinely a voluntary report of this sort, whose only use is statistical and theoretical, is more than can be expected of busy practising physicians, however interested they may be in possible results.

A total of 210 confidential blanks was returned before it became evident that the project in that form should be abandoned. Although this number is extremely small and could not possibly give results from which any general conclusions may be drawn, they have been analyzed with a view to shedding some light on the very significant question as to how much error, which can be discovered through a confidential inquiry of some sort, there is at present in recording causes of death. This small group of reports is probably fairly representative as far as it goes, inasmuch as it comprises reports on all of the deaths attended by a few physicians over a period of 2 or more months. To be sure, the physicians who reported were those who were especially interested in the project, but comparison with the original survey shows that they were not physicians who had under-reported syphilis and alcoholism any more than others. In a number of cases none of the deaths in a physician's practice were recorded with an incomplete cause on the official death certificate.

Analysis of the 210 confidential blanks reveals the following facts:

1. Information not included on the death certificate was stated on 62 or approximately 30 per cent of the returned confidential reports. In 14, or 6.7 per cent of the total number, this additional information would, if stated on the death certificate in addition to the information already there, result in a change of *International List* classification according to the *Manual of Joint Causes of Death*. Within this group of 210 deaths the following changes in assignment of cause of death resulted:

Syphilis deaths increased in number from 3 recorded deaths to 6. (This result, although based on small figures, checked closely with the results of the original survey.)

Cancer deaths increased from 25 to 28 (12 per cent).

Cerebral hemorrhage declined from 17 deaths to 14.

Deaths from diseases of the heart declined from 66 to 62.

2. Results which are of general interest but resulted in no change in classification were as follows:

Alcoholism was omitted as a contributory cause from the original death certificate in 7 cases. On no original certificate was it given as either a primary or contributory cause.

Syphilis was omitted from a total of 5 certificates. In 2 of these cancer and automobile accident were the primary causes and no change in classification resulted.

Drug addiction was included as confidential information in 2 cases.

CONCLUSIONS

The committee has set itself the problem of determining two facts, the first of which is the relative value of various methods of confidential inquiry into the cause of death. The projects in the Westchester County Health District have shown that through a direct personal contact with the physician information may be obtained successfully, but that a voluntary supplemental report, entirely separate from the death certificate and mailed to a different official agency, is not successful. The first is the most expensive and troublesome method of getting information, and the second the cheapest and easiest. It is hoped that within the coming year a modification and combination of the two methods may be attempted. For example, it might be feasible to mail to each physician at intervals of 3 months a list of the death certificates which he has signed during the period with a request that he state confidentially in each case the primary and contributory cause of death and return the list to the County Department of Health with the names detached. Some system of numbering such lists would have to be evolved inasmuch as it is essential in tabulating the statistical results to know exactly what group of original deaths has been included.

Once a suitable and reliable method of getting the information has been found the second problem is solved—namely, to determine what effect confidential and more complete information has on recorded death rates. At present the only fact that has been discovered is that in the Westchester County Health District the true death rate from syphilis is at least double the recorded rate. It remains to be proved what correction factor should be applied to this death rate in other communities or to the rates from other causes in Westchester and in other areas.

GAIUS E. HARMON, *Chairman*
MARJORIE T. BELLOWS, *Secretary*
MATTHIAS NICOLL, JR.
HAVEN EMERSON
COUNCIL OF THE VITAL STATISTICS SECTION

Forms and Methods of Statistical Practice*

THE report of the committee covered three subjects. The first discussed classification of sub-types of disease and included the following recommendation:

> That whenever a case or death is reported as due to smallpox, an effort be made to obtain from the diagnostician or epidemiologist a statement whether the disease was of the classical malignant type or of the benign type, and to indicate malignant cases or deaths in tables through an asterisk or other symbol leading to an explanatory footnote.

The second part of the report dwelt upon the desirability of promoting the use of selected age groups for expressing death and morbidity rates from certain diseases, *e.g.*, the earlier years of life for the communicable diseases of childhood. It was reported that work along these lines had been begun and that more specific recommendations would be presented at the next annual meeting. The use of standardized rates will also be considered.

The third part of the report consisted of provisionally recommended tables for monthly reports of State Health Departments. The subjects included natality, morbidity, and mortality. This report was presented by Dr. John Collinson as Chairman of the sub-committee on Standard Tables. Suggested table forms were given out at the meeting and discussed. A definitive report will be presented at the next annual meeting.

A. W. HEDRICH, *Chairman*
JOHN COLLINSON,
Chairman, Sub-committee
S. D. COLLINS
T. F. MURPHY
ELIZABETH PARKHURST
L. W. HUTCHCROFT.

* Abstract of Progress Report.

Residence Correction

THE Committee on Residence Correction (originally designated as the Committee on the Proper Allocation of Records) was appointed in October, 1926, at the Buffalo meeting of the American Public Health Association. In the course of the following nine years the need of allocating records of births and deaths according to residence (with certain exceptions in regard to deaths from tuberculosis, other chronic diseases, and external causes) has become generally recognized and has been adopted as a routine procedure by many states.

In 1934 the U. S. Bureau of the Census decided that beginning with 1935 its annual reports should be based on the resident and not, as hitherto, recorded numbers of births and deaths. The aim of the committee, namely, to bring about the establishment of a nation-wide system of residence correction having been accomplished, the committee asks that it be dissolved.

J. V. DEPORTE, *Chairman*
W. J. V. DEACON
W. THURBER FALES
A. W. HEDRICH
T. F. MURPHY
I. C. PLUMMER
G. H. VAN BUREN

Universities and Colleges in the United States and Canada Conferring Public Health Degrees

	Degrees Conferred
University of California	A.B. M.A. Ph.D. in Hygiene Dr.P.H.
Columbia University	M.S.P.H. Ph.D. in Sociology (Vital Statistics), Epidemiology, Sanitary Science, Bacteriology (Public health laboratory work)
Harvard School of Public Health	C.P.H.* M.P.H. Dr.P.H. Ph.D. in Hygiene
Johns Hopkins School of Hygiene and Public Health	C.P.H. Dr.P.H. Sc.D. in Hygiene Sc.M. in Hygiene
Massachusetts Institute of Technology	Ph.D. Dr.P.H. M.S. S.B. in Public Health S. B. in Public Health Engineering S.B. in Sanitary Engineering (The Department also awards the Certificate in Public Health)
University of Michigan	D.P.H. M.S.P.H.
University of Toronto, School of Hygiene	Ph.D. D.P.H.
University of Western Ontario	D.P.H.
Yale University, School of Medicine	M.P.H., Dr.P.H. — Offered by the Medical School M.S., Ph.D. — Offered by the Graduate School
Wayne University College of Medicine and Surgery	Dr.P.H.

* Harvard does not consider the Certificate of Public Health a degree.

Entrance Requirements for Graduate Degrees

University of California

Dr.P.H.—Graduate of an approved medical school.

Ph.D. in Hygiene—Candidates must have completed courses equivalent to those constituting the undergraduate curriculum in public health.

Columbia University

M.S. in P.H.—Graduate of a class A medical school with a degree of Doctor of Medicine or a graduate in arts or sciences having an acceptable degree of Bachelor of Science or Bachelor of Arts, and presenting evidence of having satisfactorily completed college courses in chemistry, physics, bacteriology or general biology, and mathematics. In addition such candidates should have completed a course in medical bacteriology similar to that given in the first year of the School of Medicine.

M.S. in P.H. majoring in Sanitary Science—Graduate of an approved engineering school, having a degree of B.S. in civil engineering, or its equivalent.

Harvard School of Public Health

C.P.H.—Evidence of having had satisfactory training in modern languages, inorganic, organic and biochemistry, biology, physiology, anatomy, histology, pathology and bacteriology. As a rule these requirements will be met by students possessing a bachelor's degree plus the first 2 years in an approved medical school.

M.P.H.—Satisfactory evidence of having received the M.D. degree, or its equivalent, from an approved medical school.

Dr.P.H.—Satisfactory evidence of having received the M.D. degree, or its equivalent, from an approved medical school. To qualify as a candidate, the student is required to pass an examination of the same type as that required to obtain the degree of M.P.H. It is intended to provide the assurance that all men receiving the Dr.P.H. are grounded in the four fundamental subjects and in the field most closely allied to their special interests.

Ph.D. in Hygiene—Properly qualified students in public health, who have no medical degree but who wish to secure a higher degree, may obtain a Doctor of Philosophy in Hygiene. This degree is granted by the university to men, or through Radcliffe College to women.

Johns Hopkins School of Hygiene and Public Health

C.P.H.—Graduate of approved medical school or graduate in arts or science, with adequate courses in physics, chemistry, and biology, and in the basic medical sciences, anatomy, histology, physiology and pathology.

Dr.P.H.—Applicant must be recommended by the head of the department in which he proposes to do his major work as an acceptable candidate. Students not personally known will be accepted only provisionally, final acceptance being conditioned upon the character of the work done.

In addition applicant must be:

a. Graduate of an approved medical school, who has had a liberal education as evidenced by a degree in the arts or the sciences or its equivalent, and who has completed the course leading to a C.P.H. or its equivalent.

b. Student who has fulfilled the requirements as to a liberal education and who has satisfactorily completed 3 years of this course in an approved medical school may be admitted to advanced standing which will permit him to complete the requirements for the degree in 1 year after graduation in medicine, provided arrangements are made to include in the medical course a sufficient number of courses which may be credited toward a C.P.H.; provided, also, that he is prepared, on admission, to enter upon advanced work in a selected major subject. During the year of residence, such a student, in addition to work in the major subjects, will be expected to take such of the courses leading to a C.P.H. as have not been absolved.

Sc.M. in Hygiene—*A degree in arts or science, or in medicine, from an approved school.

Certificates of the completion of adequate courses in physics, chemistry and biology.

Sc.D. in Hygiene—

a. *A degree in arts or science, or in medicine, with a reading knowledge of French and German.

b. Certificates of the satisfactory completion of adequate courses in physics, chemistry, and biology.

c. Certificates of the satisfactory completion of adequate courses in anatomy including histology, physiology, and pathology.

d. In exceptional cases, on the recommendation of the head of a department, a candidate may be accepted who offers in place of (c) satisfactory evidence of special training of an advanced character in subjects fundamental to his main field of work.

e. Not less than 1 year before being presented for the degree, the candidate will be required to pass an oral examination before a committee of the faculty. Final acceptance as a candidate for the degree will be conditioned upon favorable recommendation by the committee.

Massachusetts Institute of Technology

C.P.H.—Graduate in arts or science from a recognized institution or a medical degree from a class A medical school or have had professional training equivalent thereto.

Dr.P.H.—Graduate in arts or science from an institution of recognized standing or who have received the M.D. degree from a Class A medical school with at least 2 years of college training before entering the medical school.

University of Michigan

M.S. in P.H., D.P.H.—Candidates for graduate degree in public health, for the master's degree, M.S. in P.H., as well as for the doctorate, D.P.H., are obviously better equipped for their work if they already hold the degree of Doctor of Medicine from an accredited school. Holders of a baccalaureate degree from an accredited college, however, may be admitted to study for the master's degree or even, in exceptional cases, for the doctor's degree.

University of Toronto

D.P.H.—Graduate in medicine of this university or some other university recognized for this purpose by the Senate.

University of Western Ontario

D.P.H.—Graduate of approved School of Medicine.

Wayne University College of Medicine

Dr.P.H.—Graduate of Class A medical college. Applicants who have received the Degree of Doctor of Medicine since 1921 will be required to present, in addition to the diploma from the medical school, evidence of 2 years of academic instruction obtained in an approved school of arts and sciences.

Yale University

M.P.H.—Graduate in arts or sciences from a college or technical school of high standing or 2 years' study in a medical school of high standing.

Dr.P.H.—Graduate in medicine from a medical school of high standing.

* In exceptional circumstances, students without a college degree may, by special action of the Advisory Board, be accepted as candidates for the degree Sc.M. or Sc.D., provided they furnish satisfactory evidence of preparation fully equivalent to that usually represented by an academic degree, and of unusual accomplishment.

Foundations Appropriating Funds for Medicine and Public Health in 1934*

THE following Foundations made grants in excess of $5,000 for Medicine and Public Health:

American Foundation for Mental Hygiene	$ 10,033
Brez Foundation	14,250
Buhl Foundation	23,369
Carnegie Corp. of New York	91,000
Carnegie Institution of Washington	30,354
Chicago Community Chest	25,871
Children's Fund of Michigan	322,744
Cleveland Foundation	93,244
Committee of the Permanent Charity Fund	78,358
Commonwealth Fund	1,212,272
Detroit Community Chest	10,532
General Education Board	590,134
Murry and Leonie Guggenheim Foundation	90,000
Indianapolis Foundation	18,515
International Cancer Research Foundation	133,439
W. K. Kellogg Foundation	199,413
Lucius N. Littauer Foundation	13,615
Josiah Macy, Jr. Foundation	55,344
John and Mary R. Markle Foundation	41,774
Milbank Memorial Fund	124,838
New York Community Chest	70,091
New York Foundation	57,065
Horace H. and Mary A. Rackham Fund	98,700
A. C. Ratshesky Foundation	5,800
Rhode Island Foundation	5,255
Rockefeller Foundation	5,518,487
Julius Rosenwald Fund	121,450
Russell Sage Foundation	6,100
Thomas Thompson Trust	20,000
Amherst H. Wilder Charity	23,792
Williamsport Foundation	7,814
Youngstown Foundation	10,300

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* From *American Foundations and Their Fields,* Twentieth Century Fund, Inc., New York, N. Y.

Directory of State, City, and Full-time County Health Officers of the United States

State Health Officers

(As of February 1, 1936)

The United States Public Health Service list published in 1935 is the basis of the following. The variations represent later information received by the American Public Health Association through correspondence.

State	*Name of Health Officer*	*Post Office*	*Official Title*
Alabama	**J. N. Baker, M.D.	Montgomery	State Health Officer
Arizona	*G. C. Truman, M.D.	Phoenix	State Supt. of Public Health
Arkansas	*William B. Grayson, M.D.	Little Rock	State Health Officer
California	Dr. W. M. Dickie	Sacramento	Director, State Dept. of Health
Colorado	*M. Flint Haralson, M.D.	Denver	Acting Health Officer
Connecticut	**Stanley H. Osborn, M.D., C.P.H.	Hartford	Commissioner of Health
Delaware	*Arthur C. Jost, M.D.	Dover	Executive Secy., State Board of Health
Florida	W. A. McPhaul, M.D.	Jacksonville	State Health Officer
Georgia	*T. F. Abercrombie, M.D.	Atlanta	Commissioner of Health
Idaho	Lewis Williams	Boise	Commissioner of Public Welfare
Illinois	*Frank J. Jirka, M.D.	Springfield	Director of Public Health
Indiana	*V. K. Harvey, M.D.	Indianapolis	State Health Commissioner
Iowa	*W. L. Bierring, M.D.	Des Moines	" " "
Kansas	**Earle G. Brown, M.D.	Topeka	Secy., State Board of Health
Kentucky	**A. T. McCormack, M.D., D.P.H.	Louisville	State Health Officer
Louisiana	*Joseph A. O'Hara, M.D.	New Orleans	Pres., State Dept. of Health
Maine	*George H. Coombs, M.D.	Augusta	State Commissioner of Health
Maryland	**Robert H. Riley, M.D.	Baltimore	Director of Health
Massachusetts	*Henry D. Chadwick, M.D.	Boston	State Com. of Public Health
Michigan	**C. C. Slemons, M.D.	Lansing	State Health Commissioner
Minnesota	**A. J. Chesley, M.D.	St. Paul	Secy. and Executive Officer, State Board of Health
Mississippi	**F. J. Underwood, M.D.	Jackson	Executive Officer, Board of Health
Missouri	*E. T. McGaugh, M.D.	Jefferson City	State Health Commissioner
Montana	**W. F. Cogswell, M.D.	Helena	Health Officer
Nebraska	*Philip H. Bartholomew, M.D.	Lincoln	State Health Officer
Nevada	**Edward E. Hamer, M.D.	Carson City	" " "
New Hampshire	**Charles Duncan, M.D.	Concord	" " "
New Jersey	*J. Lynn Mahaffey, M.D.	Trenton	Director of Health, State Dept. of Health
New Mexico	**J. Rosslyn Earp, Dr.P.H.	Santa Fe	State Director of Public Health
New York	**Thomas Parran, Jr., M.D.	Albany	State Commissioner of Health
North Carolina	Carl V. Reynolds, M.D.	Raleigh	Acting State Health Officer
North Dakota	*Maysil M. Williams, M.D.	Bismarck	State Health Officer
Ohio	*Walter H. Hartung, M.D.	Columbus	Director of Health
Oklahoma	*Charles M. Pearce, M.D.	Oklahoma City	State Health Officer
Oregon	**Frederick D. Stricker, M.D.	Portland	" " "
Pennsylvania	Martha Edith MacBride-Dexter, M.D.	Harrisburg	Secretary of Health
Rhode Island	*E. A. McLaughlin, M.D.	Providence	State Health Officer
South Carolina	**James A. Hayne, M.D.	Columbia	" " "
South Dakota	*Park B. Jenkins, M.D.	Pierre	State Superintendent of Health
Tennessee	**W. C. Williams, M.D.	Nashville	Commissioner of Health
Texas	**John William Brown, M.D.	Austin	State Health Officer
Utah	*J. Louis Jones, M.D.	Salt Lake City	State Health Commissioner
Vermont	Charles F. Dalton, M.D.	Burlington	State Health Officer
Virginia	**I. C. Riggin, M.D.	Richmond	State Health Commissioner
Washington	**Erval R. Coffey, M.D.	Seattle	State Director of Health
West Virginia	*A. E. McClue, M.D.	Charleston	State Commissioner of Health
Wisconsin	**C. A. Harper, M.D.	Madison	State Health Officer
Wyoming	G. M. Anderson, M.D.	Cheyenne	" " "

Territorial and Insular Health Officers

Alaska	*Walter W. Council, M.D.	Juneau	Commissioner of Health
Hawaii	*F. E. Trotter, M.D.	Honolulu	President, Board of Health
Panama, C. Z.	*Col. O. G. Brown, M.D., Dr.P.H.	Balboa Heights	Chief Health Officer, Medical Corps, U. S. Army
Philippine Islands	*Jose Fabella, M.D.	Manila	Director of Health and Welfare
Puerto Rico	**E. Garrido Morales, M.D.	San Juan	Commissioner of Health
Virgin Islands	Knud Knud-Hansen, M.D.	St. Thomas	Commissioner of Public Health

* Member, A.P.H.A.   ** Fellow, A.P.H.A.

City Health Officers (967)

(As of February 1, 1936)

The United States Public Health Service list published in 1935 is the basis of the following. The variations represent later information received by the American Public Health Association through correspondence.

State and City	*Name of Health Officer*	*Official Title*
Alabama		
Anniston	Dr. George A. Cryer	County Health Officer
Bessemer	*J. D. Dowling, M.D.	" " "
Birmingham	*J. D. Dowling, M.D.	" " "
Decatur	*Lee Roy Murphree, M.D.	" " "
Dothan	*F. G. Granger, M.D.	" " "
Fairfield	*J. D. Dowling, M.D.	Health Officer
Florence	*W. D. Hubbard, M.D.	County Health Officer
Gadsden	*C. L. Murphree, M.D.	" " "
Huntsville.	Dr. W. C. Hatchett	" " "
Mobile	*O. L. Chason, M.D.	" " "
Montgomery	*J. L. Bowman, M.D.	County & City Health Officer
Phenix City	Dr. M. L. Shaddix	Health Officer
Selma	*L. T. Lee, M.D.	County Health Officer
Tuscaloosa	Dr. A. A. Kirk	" " "
Arizona		
Phoenix	Dr. R. W. Hussong	City Health Officer
Tucson	*Lewis H. Howard, M.D.	" " "
Arkansas		
Blytheville	Dr. I. R. Johnson	" " "
El Dorado	Dr. F. O. Mahony	" " "
Fort Smith	*James E. Johnson, M.D.	District Health Officer
Hot Springs	J. F. Merritt, M.D.	City Health Officer
Jonesboro	Dr. R. C. Shanlever	" " "
Little Rock	V. T. Webb, M.D.	" " "
North Little Rock	Dr. Val L. Eason	" " "
Pine Bluff	Dr. W. H. Bruce	Director of Health
Texarkana	Dr. Harry E. Murry	City Health Officer
California		
Alameda	*F. B. Galbraith, M.D.	Health Officer
Alhambra	**S. J. Stewart, M.D.	Medical Director
Anaheim	*K. H. Sutherland, M.D.	County Health Officer
Bakersfield	**Peter Joseph Cuneo, M.D.	Health Officer
Berkeley	**Frank L. Kelly, M.D.	" "
Beverly Hills	*Charles F. Nelson, M.D.	" "
Brawley	J. L. Parker, M.D.	" "
Burbank	T. H. Ransom, M.D.	" "
Burlingame	Matthew F. Desmond, M.D.	" "
Compton	*F. E. Estes, M.D.	" "
Eureka	*William J. Quinn, M.D.	" "
Fresno	C. Mathewson, M.D.	City Health Officer
Fullerton	*K. H. Sutherland, M.D.	County Health Officer
Glendale	*F. A. Wilmot, M.D.	District Health Officer
Huntington Park	*George M. Malkin, M.D.	" " "
Inglewood	*J. W. Robinson, M.D.	Deputy Health Officer
Long Beach	**G. E. McDonald, M.D.	City Health Officer
Los Angeles	**George Parrish, M.D.	Health Officer
Modesto	*E. F. Reamer, M.D.	County Health Officer
Monrovia	**J. M. Furstman, M.D.	County Health Officer
Oakland	*Nolton N. Ashley, M.D.	Health Officer
Ontario	C. L. Emmons, M.D.	" "
Palo Alto	**Louis Olsen	" "
Pasadena	**W. L. Halverson, M.D.	" "
Pomona	*M. U. Stoneman, M.D.	District Health Officer
Redlands	Dr. F. H. Folkins	Health Officer
Richmond	Charles Robert Blake, M.D.	City Health Commissioner
Riverside	*W. A. Jones, M.D.	Commissioner of Health
Sacramento	**Herbert F. True, M.D.	City Health Officer
Salinas	*Marie Fidel	Health Officer
San Bernardino	Dr. G. Stirling Landon	City Health Officer
San Diego	*Alex M. Lesem, M.D.	Health Officer

* Member, A.P.H.A. ** Fellow, A.P.H.A.

State and City	*Name of Health Officer*	*Official Title*
California (Cont.)		
San Francisco	**J. C. Geiger, M.D.	Health Officer
San Jose	*Henry C. Brown, M.D.	" "
San Leandro	**I. O. Church, M.D.	District Health Officer
San Mateo	Dr. J. R. Warberton	City Health Officer
Santa Ana	*K. H. Sutherland, M.D.	County Health Officer
Santa Barbara	*C. T. Roome, M.D.	Health Officer
Santa Cruz	John T. Harrington, M.D.	City Health Officer
Santa Monica	**F. G. Crandall, M.D.	District Health Officer
Santa Rosa	E. J. Helgren	Health Officer
South Gate	Hal E. Hazel	" "
South Pasadena	*Albert J. Supple, M.D.	" "
Stockton	**John J. Sippy, M.D.	District Health Officer
Vallejo	E. A. Peterson, M.D.	Health Officer
Ventura	Dr. J. A. De Serpa	" "
Whittier	*R. L. Kaufman, M.D.	District Health Officer
Colorado		
Boulder	*H. L. Morency, M.D.V.	Health Officer
Colorado Springs	**Omer R. Gillett, M.D.	City Health Officer
Denver	Dr. Fred W. Bailey	Manager of Health and Charity
Fort Collins	Dr. T. C. Taylor	Health Officer
Grand Junction	Dr. E. H. Munro	" "
Greeley	Dr. W. A. Schoen	City Health Officer
Pueblo	**W. E. Buck, M.D.	Chief, Dept. of Health
Trinidad	Dr. B. M. Cowley	City Physician
Connecticut		
Ansonia	Dr. L. Howard Wilmot	Health Officer
Bridgeport	*Richard O'B. Shea, M.D.	" "
Bristol	*Benjamin B. Robbins, M.D.	City Health Officer
Danbury	Dr. Felix F. Tomaino	Health Officer
Derby	Thomas F. Plunkett, M.D.	" "
East Hartford	Dr. Francis W. Becker	" "
Enfield	Dr. Frank F. Simonton	" "
Fairfield	**Lawrence E. Poole, M.D.	Health Officer & School Physician
Groton	Dr. Frank W. Hewes	Health Officer
Hamden	*George H. Joslin, M.D.	" "
Hartford	*T. F. O'Brien, M.D.	" "
Manchester	*D. C. Y. Moore, M.D.	Chairman, Board of Health
Meriden	*Dr. Michael J. Sullivan	Health Officer
Middletown	John G. Mountain, M.D.	" "
Milford	....	" "
Naugatuck	....	Town Health Officer
New Britain	**Louis J. Dumont, M.D.	Supt. of Health
New Haven	*Joseph I. Linde, M.D.	Health Officer
New London	*B. N. Pennell, D.V.S.	" "
Norwalk	Robert E. Perdue, M.D.	" "
Norwich	*Harrison Gray, M.D.	City Health Officer
Shelton	Dr. Edwin J. Finn	Health Officer
Stamford	*Raymond D. Fear, M.D.	Health Commissioner
Stonington	Dr. William D. Veal	Health Officer
Stratford	DeRuyter Howland, M.D.	" "
Torrington	Dr. Elias Pratt	" "
Wallingford	....	" "
Waterbury	*Edward J. Godfrey, M.D.	City Health Officer
West Hartford	*Harry B. Smith, M.D., M.P.H.	Health Officer
Willimantic	Nathan Spector, M.D.	" "
Delaware		
Wilmington	Dr. James W. Butler	Secretary, Board of Health
District of Columbia		
Washington	**George C. Ruhland, M.D.	Commissioner of Health
Florida		
Daytona Beach	Dr. Simon Reed	Health Officer
Gainesville	*W. W. Lassiter, M.D.	" "
Jacksonville	**Noble A. Upchurch, M.D.	City Health Officer
Key West	H. C. Galey, M.D.	" " "
Lakeland	Dr. J. D. Griffin	City Physician & Health Officer
Miami	*George N. MacDonell, M.D.	Director of Public Health
Orlando	Dr. C. D. Christ	City Health Officer

* Member, A.P.H.A. ** Fellow, A.P.H.A.

State and City	Name of Health Officer	Official Title
Florida (Cont.)		
Pensacola	....	Health Officer
St. Augustine	Dr. H. E. White	" "
St. Petersburg	Dr. Claude B. Wright	City Physician
Sanford	J. N. Tolar, M.D.	Health Officer
Tallahassee	Dr. L. J. Graves	" "
Tampa	*J. R. McEachern, M.D.	City Health Officer
West Palm Beach	W. E. Van Landingham, M.D.	" " "
Georgia		
Albany	Hugo Robinson, M.D.	Health Commissioner
Athens	*W. W. Brown, M.D.	" "
Atlanta	**J. P. Kennedy, M.D.	City Health Officer
Augusta	**Henry G. Callison, M.D.	City & County Health Officer
Brunswick	**M. E. Winchester, M.D.	Commissioner of Health
Columbus	Dr. W. E. Mayher	Health Officer
Decatur	Dr. J. R. Evans	" "
Griffin	Dr. William C. Humphries	Commissioner of Health
La Grange	S. C. Rutland, M.D.	" " "
Macon	*J. D. Applewhite, M.D.	City & County Health Officer
Rome	B. V. Elmore, M.D.	Commissioner of Health
Savannah	**Victor H. Bassett, M.D.	Health Officer
Thomasville	Dr. James R. Dykes	" "
Valdosta	Gordon T. Crozier, M.D.	City Health Officer
Waycross	*George E. Atwood, M.D., Dr.P.H.	Commissioner of Health
Idaho		
Boise	C. K. Macay	Health Officer
Pocatello	*E. O. Leonard	Sanitary Inspector
Illinois		
Alton	Dr. William S. McGinnis	Health Commissioner
Aurora	*George W. Haan, M.D.	" "
Belleville	Dr. R. C. Heiligenstein	Health Officer
Berwyn	*Edward J. Farrell, M.D.	Health Director
Bloomington	Dr. B. Markowitz	" "
Blue Island	*L. A. Burkhart	Health Commissioner
Brookfield	Harriet L. Hockendorf	" "
Cairo	C. L. Weber, M.D.	Health Officer & City Physician
Calumet City	E. S. O'Brien, M.D.	Health Officer
Canton	Dr. J. C. Simmons	City Physician
Centralia	Dr. J. M. Haney	City Health Officer
Champaign	Dr. George Appelle	Health Officer
Chicago	**Herman N. Bundesen, M.D.	Pres., Board of Health
Chicago Heights	Dr. Ira C. Harman	Health Commissioner
Cicero	Dr. Frank J. Pokorney	" "
Danville	Dr. C. M. Cook	" "
Decatur	*W. M. Talbert, M.D.	Medical Director, Dept. of Public Health and Safety
East Moline	J. H. Fowler, M.D.	Commissioner of Health
East St. Louis	Albert P. Lauman	" " "
Elgin	Dr. A. L. Mann	Executive Officer, Dept. of Health
Elmhurst	Dr. A. L. Mathias	Health Commissioner
Elmwood Park	*Laura Arney	Health Officer
Evanston	*John H. Pollard, M.D.	Commissioner of Health
Forest Park	Dr. George Baumgartner	" " "
Freeport	Dr. R. J. Burns	" " "
Galesburg	E. D. Wing, M.D.	Health Officer
Granite City	Dr. A. M. Jennings	" "
Harrisburg	Charles Walden, M.D.	City Physician
Harvey	M. R. Morse, M.D.	Health Officer
Highland Park	Dr. D. E. Rossiter	President, Board of Health
Jacksonville	Dr. Friedrich Engelbach	Health Officer
Joliet	Dr. E. J. Higgins	Commissioner of Health
Kankakee	Dr. Joseph A. Guertin	City Health Officer
Kewanee	Dr. C. P. White	Commissioner of Health
LaGrange	Dr. T. C. McDougal	Village Health Officer
LaSalle	*Arlington Ailes, M.D.	Health Commissioner
Lincoln	Claude Applegate	Health Officer

* Member, A.P.H.A. ** Fellow, A.P.H.A.

State and City	*Name of Health Officer*	*Official Title*
Illinois (Cont.)		
Mattoon	Dr. Lowell A. Neal	City Health Officer
Maywood	Dr. John Peters	Health Commissioner
Melrose Park	Dr. E. G. Brust	Health Officer
Moline	Dr. C. C. Ellis	" "
Mt. Vernon	Dr. Runyon Irvin	City Physician
Oak Park	*Frank S. Needham, M.D.	Commissioner of Health
Ottawa	E. P. Hathaway, M.D.	City Physician
Park Ridge	Dr. M. W. Caveney	Health Officer
Pekin	Dr. C. G. Muehlman	City Health Officer
Peoria	*Sumner M. Miller, M.D.	Health Commissioner
Quincy	*H. O. Collins, M.D.	Public Health Officer
Rockford	*Norman C. Bullock, M.D.	Commissioner of Health
Rock Island	Dr. H. W. Shuman	City Physician
Springfield	*H. H. Tuttle, M.D.	Superintendent of Health
Sterling	Dr. H. M. Jacobs	Health Officer
Streator	Dr. Theresa K. Jennings	President, Board of Health
Urbana	Dr. L. M. T. Stilwell	Chairman, Board of Health
Waukegan	Dr. H. Floyd Cannon	City Health Officer
West Frankfort	William T. Fife	" " "
Wilmette	Dr. Martin H. Seifert	Commissioner of Health
Winnetka	*H. A. Orvis, M.D.	Health Officer
Indiana		
Anderson	Dr. G. E. Metcalf	Secretary, Board of Health
Bedford	Charles H. Blackburn	Health Officer
Bloomington	Dr. C. E. Holland	" "
Connersville	Herman W. Smelser, M.D.	" "
Crawfordsville	Fred N. Daugherty, M.D.	Secretary, Board of Health
East Chicago	Dr. Joseph A. Teegarden	" " " "
Elkhart	I. J. Markel, M.D.	" " " "
Elwood	Dr. Frank V. Newcomer	" " " "
Evansville	L. E. Fritsch, M.D.	" " " "
Fort Wayne	Dr. Karl C. Eberly	Health Commissioner
Frankfort	Dr. A. G. Chittick	Secretary, Board of Health
Gary	Walter M. Behn, M.D.	" " " "
Goshen	G. A. Whippy, M.D.	Health Officer
Hammond	Dr. H. G. Cole	Health Commissioner
Huntington	R. F. Frost, M.D.	Secretary, Board of Health
Indianapolis	Herman G. Morgan, M.D.	" " " "
Jeffersonville	Samuel L. Adair, M.D.	Health Officer
Kokomo	....	Secretary, Board of Health
LaFayette	M. M. Lairy, M.D.	" " " "
LaPorte	J. N. Kelly, M.D.	Health Officer
Logansport	Louis P. Deuner	Health Inspector
Marion	L. H. Eshleman, M.D.	Secretary, Board of Health
Michigan City	Dr. L. M. Robrock	Health Officer
Mishawaka	Lyman Swanger	Secretary, Board of Health
Muncie	Dr. J. H. Williams	" " " "
New Albany	A. I. McKamy, Ph.D., M.D.	" " " "
Newcastle	Walter M. Stout, M.D.	" " " "
Peru	W. H. Wagoner, M.D.	" " " "
Richmond	M. F. Johnston, M.D.	Health Commissioner
Shelbyville	Walter C. McFadden, M.D.	Health Officer
South Bend	*F. R. Nicholas Carter, M.D.	" "
Terre Haute	Dr. Amos H. Caffee	Secretary, Board of Health
Vincennes	R. S. Moore, M.D.	" " " "
Whiting	Dr. J. A. McCarthy	City Health Officer
Iowa		
Ames	Dr. B. D. Atchley	City Health Officer
Boone	William Woodburn, M.D.	Health Officer
Burlington	Dr. Arthur C. Schach	City Physician
Cedar Rapids	James Yanda	City Health Officer
Clinton	Dr. Leslie K. Fenlon	" " "
Council Bluffs	Dr. J. M. Moskovitz	" " "
Davenport	*A. B. Kuhl, Jr., M.D.	Health Officer
Des Moines	*Harry E. Ransom, M.D.	Health Commissioner
Dubuque	W. J. Connell, M.D.	Director of Health
Fort Dodge	Dr. J. E. Galvin	City Physician
Fort Madison	Harold F. Noble, M.D.	" "

* Member, A.P.H.A. ** Fellow, A.P.H.A.

State and City	Name of Health Officer	Official Title
Iowa (Cont.)		
Iowa City	Dr. Isom A. Rankin	Health Officer
Keokuk	Dr. Charles A. Dimond	" "
Marshalltown	Dr. R. S. Grossman	" "
Mason City	Dr. C. M. Franchere	City Health Officer
Muscatine	R. M. Arey, M.D.	" " "
Newton	Dr. M. R. Hammer	City Physician
Oskaloosa	Dr. Oscar J. DuBois	Health Officer
Ottumwa	Dr. William Herrick	City Health Officer
Sioux City	*W. S. Petty, M.D.	Field Agent, U.S.P.H.S.
Waterloo	J. E. Ridenour, M.D.	Health Officer
Kansas		
Arkansas City	Dr. P. F. Theis	City Health Officer
Atchison	Dr. William K. Fast	County Health Officer
Chanute	Dr. R. A. Light	City Health Officer
Coffeyville	Dr. P. S. Townsend	" " "
Dodge City	C. L. Hooper	Health Officer
Eldorado	Jack Loman	Sanitary Inspector
Emporia	Dr. C. H. Munger	County Health Officer
Fort Scott	C. L. Mosley, M.D.	City Health Officer
Hutchinson	G. R. Walker, M.D.	City Physician
Independence	....	City Health Officer
Kansas City	Dr. H. W. Kassel	Director of Health
Lawrence	*James M. Mott, M.D.	Supt. of Public Health
Leavenworth	Dr. A. R. Adams	City Health Officer
Manhattan	Dr. Darrell Evans	Health Officer
Newton	Dr. M. C. Martin	" "
Parsons	Dr. L. A. Proctor	City Health Officer
Pittsburg	Dr. C. Mart Montes	" " "
Salina	Dr. W. R. Dillingham	" " "
Topeka	Dr. F. P. Helm	Secretary, Board of Health
Wichita	*J. E. Wolfe, A.B., M.D.	Director, Public Welfare
Kentucky		
Ashland	R. D. Higgins, M.D.	Health Officer
Bowling Green	*George M. Wells, M.D.	" "
Covington	Dr. Theodore Sallee	City Health Officer
Fort Thomas	Dr. Frank H. Southgate	Health Officer
Frankfort	Dr. R. M. Coblin	City Health Officer
Henderson	Dr. J. L. Tauner	County Health Officer
Hopkinsville	Philip E. Haynes, M.D.	City Health Officer
Lexington	Dr. Charles M. Moore	Health Officer
Louisville	*Hugh R. Leavell, M.D.	Health Director
Middlesboro	M. D. Hoskins, M.D.	County Health Officer
Newport	John Todd, M.D.	Health Officer
Owensboro	Dr. A. L. Kincheloe	County Health Officer
Paducah	Dr. R. W. Robertson	City Health Officer
Louisiana		
Alexandria	Dr. R. B. Wallace	President, Board of Health
Baton Rouge	Thomas J. McHugh, M.D.	City Health Officer
Bogalusa	Dr. J. H. Slaughter	Health Officer
Lafayette	Dr. G. A. Martin	City Physician
Lake Charles	Dr. W. P. Bordelon	President, Board of Health
Monroe	Henry Haas	Supt., City Sanitary Dept.
New Orleans	*James M. Batchelor, M.D.	Superintendent of Public Health
Shreveport	*W. J. Sandidge, M.D.	" " " "
Maine		
Auburn	E. Leathers, M.D.	Health Officer
Augusta	*George A. Coombs, M.D.	" "
Bangor	Harry D. McNeil, M.D.	" "
Bath	Dr. Joseph I. Smith	Health Officer & Milk Inspector
Biddeford	John W. Mahoney	Health Officer
Lewiston	*R. J. Wiseman, Jr., M.D.	" "
Portland	**Thomas Tetreau, M.D.	" "
Sanford	*William H. Kelly, M.D.	Local Health Officer
South Portland	Dr. Roderick L. Huntress	Health Officer
Waterville	Arthur R. Daviau, M.D.	" "
Westbrook	P. H. Welch	" "

* Member, A.P.H.A. ** Fellow, A.P.H.A.

State and City	*Name of Health Officer*	*Official Title*
Maryland		
Annapolis	Dr. James J. Murphy	City Health Officer
Baltimore	**Huntington Williams, M.D.	Commissioner of Health
Cumberland	Harvey H. Weiss	Health Officer & Registrar
Frederick	*E. C. Kefauver, M.D.	Health Officer
Hagerstown	Dr. W. R. Cameron	County Health Officer
Salisbury	*Seth H. Hurdle, M.D.	" " "
Massachusetts		
Adams	J. F. McLaughlin, M.D.	Chairman, Board of Health
Amesbury	Clarence S. Morse	Agent, Board of Health
Arlington	William H. Bradley	" " " "
Athol	Marion B. Sibley, M.D.	Secretary, Board of Health
Attleboro	*William O. Hewitt, M.D.	Health Officer
Belmont	*Thomas F. Harris	Agent, Board of Health
Beverly	Alonzo O. Woodbury	" " " "
Boston	W. B. Keeler, M.D.	Health Commissioner
Braintree	Mortimer N. Peck	Agent, Board of Health
Brockton	*David B. Tuholski, M.D.	Health Officer
Brookline	**Francis P. Denny, M.D.	" "
Cambridge	Dr. Simon B. Kelleher	Medical Inspector
Chelsea	John F. Welch	Health Officer
Chicopee	....	Agent, Board of Health
Clinton	Frederick E. Murphy	" " " "
Danvers	Hogo Nappe, R.N.	Health Officer
Dedham	Thomas J. Breman	Health Inspector
Easthampton	Clemence C. Buckner	Agent, Board of Health
Everett	William F. Hogan	" " " "
Fairhaven	F. Fred Delano	Executive Officer
Fall River	*Ernest M. Morris, M.D.	Health Commissioner
Fitchburg	Fred R. Brigham	Agent, Board of Health
Framingham	David Moxon, C.P.H.	" " " "
Gardner	William P. O'Donnell	" " " "
Gloucester	Dr. P. E. Curley	Sanitary Inspector
Greenfield	George P. Moore	Agent, Board of Health
Haverhill	*Fred W. Morse	" " " "
Holyoke	Dr. Daniel P. Harnett	Health Officer
Lawrence	Daniel J. Costello	Clerk, Board of Health
Leominster	Hugh E. Crain	Chairman, Board of Health
Lowell	*John J. McNamara, M.D.	Agent, Board of Health
Lynn	*James A. Dumas, M.D.	Commissioner of Public Health
Malden	Mary C. Welsh	Agent, Board of Health
Marlborough	John J. Cassidy	" " " "
Medford	William M. Lanigan, M.D.	Medical Inspector
Melrose	Clarence P. Holden, M.D.	Chairman, Board of Health
Methuen	Dr. John Oddy	Board of Health Physician
Milford	Clifton Tyler	Secretary, Board of Health
Milton	Paul W. Kimball, M.D.	Agent, Board of Health
Natick	Dr. Charles D. Colford	" " " "
Needham	*G. D. Buckner	Health Officer
New Bedford	**William G. Kirschbaum	Agent & Executive Officer
Newburyport	*W. N. O'Brien, Ph.D.	Agent, Board of Health
Newton	*Harold D. Chope, M.D.	Health Officer
North Adams	Douglas W. Hyde, S.E.	Agent, Board of Health
North Attleboro	Dr. Michael E. Vance	Health Officer
Northampton	George R. Turner	Agent, Board of Health
Norwood	John A. Shannon	" " " "
Peabody	*Percy F. Murray	" " " "
Pittsfield	*Willys M. Monroe, M.D.	City Health Officer
Plymouth	Almeda Chandler	....
Quincy	Dr. Richard M. Ash	Health Commissioner
Revere	Dr. Frank Sandler	Chairman, Board of Health
Salem	**John J. McGrath	Agent, Board of Health
Saugus	Henry C. Westendarp	Chairman, Board of Health
Somerville	Frank L. Morse, M.D.	Medical Inspector
Southbridge	Albert R. Brown	Agent, Board of Health
Springfield	*L. J. Smith, M.D.	City Health Officer
Stoneham	*George A. Hinchcliffe	Health Officer
Swampscott	Clarence W. Horton	" "
Taunton	*John J. McNamara, M.D.	Chairman, Board of Health
Wakefield	David Taggart	Health Officer

* Member, A.P.H.A. ** Fellow, A.P.H.A.

State and City	*Name of Health Officer*	*Official Title*
Massachusetts (Cont.)		
Waltham	Joseph T. Mulcahy	Director of Public Welfare
Watertown	Fred W. Bodge	Health Officer
Webster	Dr. Daniel Casey	Chairman, Board of Health
Wellesley	**Prof. C. M. Hilliard	Health Officer
Westfield	Dr. Robert M. Marr	Chairman, Board of Health
West Springfield	John J. Lysaght	Agent, Board of Health
Weymouth	F. L. Doucett, M.D.	Clerk, Board of Health
Winchester	*Maurice Dineen	Agent, Board of Health
Winthrop	William D. Childress	" " " "
Woburn	Edward T. Gorman	Health Officer
Worcester	*Peter O. Shea, M.D.	Director, Board of Health
Michigan		
Adrian	Dr. W. S. Mackenzie	Health Officer & City Physician
Alpena	Dr. F. J. O'Donnell	Health Officer
Ann Arbor	....	" "
Battle Creek	A. A. Hoyt, M.D.	" "
Bay City	*George W. Moore, M.D.	City Physician
Benton Harbor	E. R. Taylor, M.D.	Director of Public Health
Dearborn	*C. A. Christensen, M.D.	Commissioner of Health
Detroit	**Henry F. Vaughan, Dr.P.H.	" " "
Ecorse	L. H. Van Becelaere, M.D.	Health Officer
Escanaba	Dr. Harry J. Defnet	" "
Ferndale	Dr. Willard G. Beattie	" "
Flint	*Leslie Lambert, M.D.	" "
Grand Rapids	**John L. Lavan, M.D.	" "
Grosse Pointe	*Benjamin H. Warren, M.D.	" "
Hamtramck	Dr. Peter E. Bolewicki	Health Commissioner
Highland Park	Dr. George M. Livingston	Health Officer
Holland	William Westrate, M.D.	" "
Iron Mountain	James L. Browning, M.D.	" "
Ironwood	*C. C. Urquhart, M.D.	City Health Officer
Jackson	....	Health Officer
Kalamazoo	*I. W. Brown, M.D.	Director of Health
Lansing	*E. R. Vanderslice, M.D.	Health Director
Lincoln Park	Dr. H. K. Butterworth	Health Officer
Marquette	*F. McD. Harkin, M.D.	" "
Menominee	Dr. John T. Kaye	" "
Monroe	Dr. William F. Acker	" "
Mount Clemens	W. S. Kane, M.D.	....
Muskegon	Dr. M. E. Stone	Health Officer
Muskegon Heights	Dr. O. M. LaCore	" "
Niles	Dr. Lawrence M. Rutz	" "
Owosso	W. E. Ward, M.D.	" "
Pontiac	*C. A. Neafie, M.D.	Director of Public Health
Port Huron	A. L. Callery, M.D.	Health Officer
River Rouge	Dr. Claud Smith	" "
Royal Oak	Dr. Donald A. Cameron	City Health Officer
Saginaw	*Frank A. Poole, M.D.	Health Officer
Sault Ste. Marie	*E. A. Cornell, M.D.	" "
Traverse City	G. A. Holliday, M.D.	" "
Wyandotte	*Earl H. Engel, M.D.	" "
Ypsilanti	Dr. B. M. Harris	City Health Officer
Minnesota		
Albert Lea	Dr. Donald S. Branham	Health Inspector
Austin	Dr. Peter A. Lommen	Chairman, Board of Health
Brainerd	Dr. V. E. Quanstrom	City Health Officer
Duluth	*M. McC. Fischer, M.D.	Health Officer
Faribault	*Frederick U. Davis, M.D.	Health Commissioner
Hibbing	Dr. C. N. Harris	Chairman, Board of Health
Mankato	Dr. W. A. Beach	Health Commissioner
Minneapolis	*F. E. Harrington, M.D.	" "
Rochester	*C. H. Mayo, M.D.	Health Officer
St. Cloud	Dr. H. W. Goehrs	City Physician
St. Paul	Dr. R. B. J. Schoch	Health Officer
South St. Paul	Dr. O. S. Ely	" "
Virginia	Dr. J. Arnold Malmstrom	" "
Winona	*William V. Lindsay, M.D.	" "

* Member, A.P.H.A. ** Fellow, A.P.H.A.

State and City	Name of Health Officer	Official Title
Mississippi		
Biloxi	G. F. Carroll, M.D.	Health Officer
Clarksdale	*N. C. Knight, M.D.	Director, County Health Dept.
Columbus	Dr. C. E. Lehmberg	County Health Officer
Greenville	*John W. Shackleford, M.D.	City Health Officer
Greenwood	*L. A. Barnett, M.D.	Health Officer
Gulfport	Daniel J. Williams, M.D.	" "
Hattiesburg	*B. D. Blackwelder, M.D.	County Health Officer
Jackson	W. E. Noblin, M.D.	Director, County Health Unit
Laurel	Dr. L. B. Beech	City Health Officer
McComb	**T. Paul Haney, Jr., M.D.	County Health Officer
Meridian	*D. V. Galloway, M.D.	Director, County Health Dept.
Natchez	*A. R. Perry, M.D.	" " " "
Vicksburg	*F. Michael Smith, M.D.	" " " "
Missouri		
Cape Girardeau	Lee Slagle	Sanitary Inspector
Columbia	W. A. Norris, M.D.	City Health Commissioner
Hannibal	*Eugene M. Lucke, M.D.	Field Agent
Independence	F. L. Cook, M.D.	City Physician
Jefferson City	Dr. James G. Bruce	" "
Joplin	Dr. A. Benson Clark	Commissioner of Health & Sanitation
Kansas City	....	Director of Health
Maplewood	Dr. Pierre M. Brossard	Health Officer
Moberly	Dr. C. C. Smith	City Health Officer
St. Charles	Dr. L. E. Belding	City Physician
St. Joseph	A. J. Smith, M.D.	City Health Officer
St. Louis	*Joseph F. Bredeck, M.D., D.P.H.	Health Commissioner
Sedalia	J. H. Brooks	Sanitary Officer
Springfield	Ralph W. Langston	Commissioner of Health & Sanitation
University City	*O. P. Hampton, Jr., M.D.	Health Officer
Webster Groves	*Carl C. Irick, M.D.	Health Commissioner
Montana		
Anaconda	Dr. John J. Malee	City Physician
Billings	*E. G. Balsam, M.D.	City Health Officer
Butte	Joseph J. Kane, M.D.	" " "
Great Falls	**Frank L. Watkins, M.D.	Field Agent, U.S.P.H.S.
Helena	Dr. W. M. Copenhaver	City Health Officer
Missoula	*F. D. Pease, M.D.	Health Officer
Nebraska		
Beatrice	Dr. J. R. Leibee	City Physician
Fremont	Dr. R. T. Van Metre	Health Officer
Grand Island	W. M. Wheeler	City Engineer
Hastings	*E. J. Latta, M.D.	City Physician
Lincoln	*M. F. Arnholt, M.D.	Superintendent of Health
Norfolk	Dr. V. L. Seman	Secretary, Board of Health
North Platte	Josiah B. Redfield, M.D.	City Physician
Omaha	Dr. F. H. Kinyoun	Health Commissioner
Nevada		
Reno	A. F. Adams, M.D.	Secretary, Board of Health
New Hampshire		
Berlin	*Eli A. Marcoux, B.S.	Health Officer
Claremont	*William P. Prescott	" "
Concord	*Travis P. Burroughs, M.D.	City Health Officer
Dover	William E. Whiteley	Executive Officer, Board of Health
Keene	Dr. Arthur A. Pratt	Health Officer
Laconia	Dr. E. J. Gage	" "
Manchester	**Howard A. Streeter, M.D.	" "
Nashua	*Deering G. Smith, M.D.	Chairman, Health Dept.
Portsmouth	Dr. L. R. Hazzard	Chairman, Board of Health
Rochester	Charles E. Goodwin	Health Officer
New Jersey		
Asbury Park	**Budd H. Obert, M.D.	Health Officer
Atlantic City	**Samuel L. Salasin, M.D.	" "
Bayonne	**William W. Brooke, M.D.	" "
Belleville	Eugene T. Berry	" "
Bloomfield	*Joseph C. Saile, M.D.	" "

* Member, A.P.H.A. ** Fellow, A.P.H.A.

State and City	*Name of Health Officer*	*Official Title*
New Jersey (Cont.)		
Bridgeton	John E. Robbins	Sanitary Inspector
Burlington	Mrs. Kathryn C. Phillips	Health Officer
Camden	A. L. Stone, M.D.	Director of Public Health
Cartaret	....	Health Officer
Cliffside Park	Fred J. Dyer	" "
Clifton	*Lester F. Meloney, M.D.	" "
Collingswood	Harold K. Eynon, M.D.	Medical Inspector
Dover	John G. Taylor	Health Officer
East Orange	**F. J. Osborne	" "
Elizabeth	*Louis J. Richards	" "
Englewood	*H. R. H. Nicholas	" "
Garfield	Charles B. Bleasby, M.D.	" "
Gloucester	J. Alonzo Beck, M.D.	" "
Hackensack	**L. Van D. Chandler	" "
Harrison	John T. McClure	" "
Hawthorne	Dr. William Missouellie	" "
Hoboken	Joseph F. X. Stack, M.D.	Commissioner of Health
Irvington	William S. Bailey	Health Officer
Jersey City	James J. Hagan, M.D.	" "
Kearny	*Amos Field, Jr.	" "
Linden	M. E. Noe	" "
Lodi	H. H. Brevoort, M.D.	Health Inspector
Long Branch	R. Clifford Errickson	" "
Maplewood	*Marie Harrison, R.N.	Health Officer
Millville	R. H. Knowles, Ph.G.	" "
Montclair	*Carl T. Pomeroy, C.P.H.	" "
Morristown	John F. Kilkenny	" "
New Brunswick	E. I. Cronk, M.D.	" "
Newark	**Charles V. Craster, M.D.	" "
Nutley	Eugene H. Sullivan	" "
Orange	*William M. Brien, M.D.	" "
Passaic	*John N. Ryan, M.D.	" "
Paterson	**F. P. Lee, M.D.	" "
Perth Amboy	*Charles S. Thompson, D.V.S.	" "
Phillipsburg	Dr. William Dana Pursel	Town Physician
Plainfield	*Andrew J. Krog	Acting Health Officer
Pleasantville	Dr. Robert M. Grier	Health Inspector
Rahway	*Fred M. Williams	Health Officer
Red Bank	William H. Lawes	Sanitary Inspector
Ridgefield	William F. Reynolds, D.V.M.	Health Officer
Ridgewood	H. H. Pettit, M.D.	" "
Roselle	*P. A. Proudfoot, M.D.	" "
Rutherford	Marine Dunn	Sanitary Inspector
South Orange	Dr. A. C. Benedict	Health Officer
South River	Dr. Abraham A. Pansy	" "
Summit	*Henry P. Dengler, M.D.	Executive Officer, Board of Health
Trenton	Alton S. Fell, M.D.	Health Officer
Union City	Grant P. Curtis, M.D.	" "
Westfield	Andrew Carney	" "
West New York	*Rudolph Kunze	Chief Inspector
West Orange	David E. Buckley	Health Officer
New Mexico		
Albuquerque	**James R. Scott, M.D.	Health Officer
Roswell	W. W. Phillipps, M.D.	County Health Officer
Santa Fe	*E. F. McIntyre, M.D.	Health Officer
New York		
Albany	*Daniel V. O'Leary, M.D.	Health Officer
Amsterdam	*P. J. Fitzgibbons, M.D.	" "
Auburn	*John W. Copeland, M.D.	" "
Batavia	Emery F. Will, M.D.	" "
Beacon	Charles B. Dugan, M.D.	" "
Binghamton	*Chalmer J. Longstreet, M.D.	" "
Buffalo	**Francis E. Fronczak, M.D.	Health Commissioner
Cohoes	Dr. E. M. Bell	City Health Officer
Corning	*Henry E. Elwood, Jr., M.D.	Health Officer
Cortland	**Merle French, M.D.	" "
Dunkirk	*Edgar Bieber, M.D.	" "
Elmira	*Reeve B. Howland, M.D.	" "

* Member, A.P.H.A. ** Fellow, A.P.H.A.

State and City	*Name of Health Officer*	*Official Title*
New York (Cont.)		
Endicott	*M. W. Welch, M.D.	Health Officer
Floral Park	*Arthur E. Goldfarb, M.D.	" "
Freeport	*William H. Runcie, M.D.	" "
Fulton	Dr. F. Edward Fox	" "
Geneva	**C. W. Grove, M.D.	" "
Glen Cove	Joseph B. Connolly, M.D.	" "
Glens Falls	Virgil D. Selleck, M.D.	" "
Gloversville	Felix L. Johnson, M.D.	" "
Hempstead	*William H. Runcie, M.D.	" "
Herkimer	James W. Graves, M.D.	" "
Hornell	*George E. Taylor, M.D.	" "
Hudson	*Louis Van Hoesen, M.D.	" "
Ithaca	*Lowell T. Genung, M.D.	" "
Jamestown	*William M. Sill, M.D.	Supt. of Public Health
Johnson City	Rollin O. Crosier, M.D.	Health Officer
Johnstown	Guy Vail Wilson, M.D.	" "
Kenmore	*E. R. Linklater, M.D.	" "
Kingston	L. E. Sanford, M.D.	" "
Lackawanna	*L. M. Michalek, M.D.	" "
Little Falls	George S. Eveleth, M.D.	" "
Lockport	Dr. G. H. Barone	City Health Officer
Lynbrook	Dr. F. M. Galloway	Health Officer
Mamaroneck	Dr. Edward M. Clark	" "
Massena	*C. E. Elkins, M.D.	" "
Middletown	*H. J. Shelley, M.D.	" "
Mount Vernon	Frank W. Shipman, M.D.	Commissioner of Health
Newburgh	Thomas J. Burke, M.D.	Health Officer
New Rochelle	*Bertrand F. Drake, M.D.	" "
New York	**John L. Rice, M.D.	Commissioner of Health
Niagara Falls	*Edward E. Gillick, M.D.	Health Officer
North Tonawanda	H. C. Lapp, M.D.	" "
Ogdensburg	*Frederick E. Clark, M.D.	" "
Olean	*Joseph P. Garen, M.D.	" "
Oneida	Dr. E. L. Finley	" "
Oneonta	Dr. George W. Augustin	" "
Ossining	Robert R. Bloom, M.D.	" "
Oswego	Dr. James E. Mansfield	" "
Peekskill	*J. Douglas Barry, M.D.	" "
Plattsburg	*Leo F. Schiff, M.D.	" "
Port Chester	W. J. Sheehan, M.D.	" "
Port Jervis	G. Otto Pobe, M.D.	" "
Poughkeepsie	W. H. Conger, M.D.	" "
Rensselaer	Dr. James C. Sharkey	" "
Rochester	*Arthur M. Johnson, M.D.	" "
Rockville Center	*A. D. Jacques, M.D.	" "
Rome	Lewis N. Eames, M.D.	" "
Saratoga Springs	Dr. Frederic J. Resseguie	" "
Schenectady	*J. B. Garlick, M.D.	Commissioner of Health
Syracuse	*Gregory D. Mahar, M.D.	" " "
Tonawanda	Dr. R. H. Wilcox	Health Officer
Troy	*James H. Flynn, M.D.	Health Commissioner
Utica	*Hugh H. Shaw, M.D.	Health Officer
Valley Stream	*John M. Quinn, M.D.	" "
Watertown	George B. Van Doren, M.D.	" "
Watervliet	Charles A. Birmingham, M.D.	Commissioner of Health
White Plains	**Edward H. Marsh, M.D.	Health Officer
Yonkers	*Louis V. Waldron, M.D.	Commissioner of Health
North Carolina		
Asheville	Dr. John W. Williams	Health Officer
Charlotte	Dr. G. L. Rea	" "
Concord	*Daniel Greenlee Caldwell, M.D.	County Health Officer
Durham	**Jesse H. Epperson, M.S.	Superintendent of Health
Elizabeth City	Dr. I. A. Ward	Health Officer
Fayetteville	M. T. Foster, M.D.	" "
Gastonia	*McG. Anders, M.D.	City Physician
Goldsboro	Dr. D. Fletcher Reeves	Director of Public Health
Greensboro	**C. C. Hudson, M.D.	Health Officer
High Point	Dr. W. J. McAnally	City Health Officer
Kinston	*Z. V. Moseley, M.D.	Health Officer

* Member, A.P.H.A. ** Fellow, A.P.H.A.

State and City	*Name of Health Officer*	*Official Title*
North Carolina (Cont.)		
New Bern	Dr. N. M. Gibbs	Health Officer
Raleigh	Dr. Carl V. Reynolds	Acting Health Officer
Rocky Mount	*Dr. J. Allen Whitaker	Superintendent of Health
Salisbury	**Charles Wallace Armstrong, M.D.	County Health Officer
Shelby	Dr. D. F. Moore	Health Officer
Statesville	Dr. R. S. McElwee	County Health Physician
Thomasville	*G. C. Gambrell, M.D.	Health Officer
Wilmington	*A. H. Elliot, M.D.	" "
Wilson	*W. H. Anderson, M.D.	" "
Winston-Salem	**R. L. Carlton, M.D.	" "
North Dakota		
Bismarck	Dr. Albert M. Fisher	Health Officer
Fargo	Dr. Harvey S. Skarshaug	" "
Grand Forks	Dr. J. M. Hofto	" "
Minot	Dr. J. L. Devine	" "
Ohio		
Akron	*Melville D. Ailes, M.D.	Director of Health
Alliance	Dr. Floyd R. Stamp	Health Officer
Ashland	Dr. Robert P. Bogniard	Director of Public Welfare
Ashtabula	Dr. James H. Park	City Health Officer
Barberton	H. A. Finefrock, M.D.	Health Commissioner
Bellaire	William E. Shepard, M.D.	Health Officer
Bucyrus	*W. G. Carlisle, M.D.*	*Health Commissioner*
Cambridge	Carl M. Oshe	" "
Campbell	James S. Mariner, M.D.	" "
Canton	F. M. Sayre, M.D.	" "
Chillicothe	*R. E. Bower, M.D.	Commissioner of Health
Cincinnati	*Owen C. Fisk, M.D.	Health Commissioner
Cleveland	**Harold J. Knapp, M.D.	" "
Cleveland Heights	*Robert Lockhart, M.D.	Director of Health
Columbus	*Nelson C. Dysart, M.D.	Health Commissioner
Coshocton	S. B. Kister, M.D.	" "
Cuyahoga Falls	**R. H. Markwith, M.D.	" "
Dayton	A. O. Peters. M.D.	Commissioner of Health
East Cleveland	George W. Stober, M.D.	Director of Health
East Liverpool	Dr. Roy C. Costello	Health Commissioner
Elyria	*G. E. French, M.D.	" "
Euclid	*Robert Lockhart, M.D.	Health Officer
Findlay	Marthy Laffey, R.N.	Health Commissioner
Fostoria	....	" "
Fremont	E. L. Vermilya, M.D.	" "
Garfield Heights	*Robert Lockhart, M.D.	Health Officer
Hamilton	*C. J. Baldridge, M.D.	Health Commissioner
Ironton	H. S. Allen, M.D.	" "
Lakewood	Wallace J. Benner, M.D.	" "
Lancaster	Clifford E. Snider, M.D.	" "
Lima	James B. Poling, M.D.	" "
Lorain	*Valloyd Adair, M.D.	" "
Mansfield	*Millard C. Hanson, M.D.	" "
Marietta	Dr. F. S. McGee	" "
Marion	Dr. Kenneth D. Smith	Commissioner of Health
Martins Ferry	John Donovan	Health Commissioner
Massillon	Dr. Dwight L. Fisher	" "
Middletown	**G. D. Lummis, M.D.	Health Officer
Newark	W. H. Knauss, M.D.	Health Commissioner
New Philadelphia	**Joseph Blickensderfer, M.D.	" "
Niles	W. A. Werner, M.D.	" "
Norwood	Louis O. Saur, M.D.	" "
Painesville	*Clara Carter Wilder, R.N.	Health Officer
Parma	*Robert Lockhart, M.D.	" "
Piqua	L. G. Whitney	Health Commissioner
Portsmouth	O. D. Tatjo, M.D.	Health Officer
Salem	Dr. R. T. Holzbach	Health Commissioner
Sandusky	*F. M. Houghtaling, M.D.	" "
Shaker Heights	*Paul Marcus Spurney, M.D.	Health Officer
Springfield	*Oscar M. Craven, M.D.	Director of Public Health
Steubenville	*Julius A. Pizzoferrato	Health Commissioner
Struthers	Dr. Charles Scofield	Health Officer
Tiffin	*J. A. Goslin, M.D.	Commissioner of Health

* Member, A.P.H.A. ** Fellow, A.P.H.A.

State and City	*Name of Health Officer*	*Official Title*
Ohio (Cont.)		
Toledo	Dr. Basil B. Brim	Health Officer
Warren	M. T. Knappenberger, M.D.	Health Commissioner
Wooster	*William G. Rhoten, M.D.	" "
Xenia	Dr. A. D. De Haven	Health Officer
Youngstown	Dr. C. H. Beight	Health Commissioner
Zanesville	Dr. D. G. Candy	Supt. of Health & Sanitation
Oklahoma		
Ada	Dr. O. E. Welborn	City Health Officer
Ardmore	A. Y. Easterwood, M.D.	" " "
Bartlesville	Elizabeth Chamberlin, M.D.	Superintendent of Health
Chickasha	Dr. E. L. Dawson	" " "
Enid	R. C. Baker, M.D.	" " "
Lawton	*Fratis Duff	Health Officer
McAlester	....	Superintendent of Health
Muskogee	Dr. I. T. Woodburn	City Physician
Oklahoma City	*W. H. Miles, M.D.	Health Director
Okmulgee	Raymond DeVoy	Sanitary Inspector
Ponca City	Mildred Headley, M.D.	Health Officer
Sapulpa	A. C. Frampton	Dairy & Health Inspector
Seminole	E. R. McAllister, M.D.	Health Officer
Shawnee	Dr. Leroy J. Neal	City Physician
Tulsa	Dr. J. Jeff Billington	Superintendent of Health
Wewoka	Dr. George Hunter	Health Officer
Oregon		
Astoria	*Nellie S. Vernon, M.D.	City Health Officer
Eugene	Dr. Donald C. Romig	" " "
Klamath Falls	Dr. G. S. Newsom	Health Officer
Medford	*Dr. C. I. Drummond	" "
Portland	*John G. Abele, M.D.	City Health Officer
Salem	*Vernon A. Douglas, M.D.	" " "
Pennsylvania		
Aliquippa	J. E. Tanner	Health Officer
Allentown	**J. Treichler Butz, M.D.	" "
Altoona	R. A. Herbert	Chief, Bureau of Health
Ambridge	Louis Herrmann	Health Officer
Arnold	Frank E. Morrison	Secretary, Board of Health
Beaver Falls	William Elmes, M.E.	Health Officer
Bellevue	James B. Arthur	" "
Berwick	C. E. Ross	" "
Bethlehem	Dr. F. J. Conahan	City Physician
Braddock	James E. Wills	Health Officer
Bradford	R. G. Vogel	" "
Bristol	John M. Wright	" "
Butler	J. Fred Leetch	" "
Cannonsburg	Frank Milligan	" "
Carbondale	Paul Nelson	Sanitary Officer
Carlisle	U. Grant Eppley	Health Officer
Carnegie	Joseph Lewis	" "
Chambersburg	Frank J. Croft	Health Officer
Charleroi	J. M. Hill	City Health Officer
Chester	Timothy McCarey	Health Officer
Clairton	F. F. Keller	" "
Coatesville	Charles V. Peace, V.M.D.	" "
Columbia	George M. Rodenhauser	" "
Connellsville	D. H. Minerd	" "
Conshohocken	Thomas S. White	Secretary, Board of Health
Coraopolis	Henry N. Holdren, Jr.	Health Officer
Dickson City	Joseph S. Kalwaytis	Secretary, Board of Health
Donora	Herman Lang	Health Officer
Dormont	Henry Chrystal	" "
DuBois	J. I. Brockbank, M.D.	" "
Dunmore	William Ferrese	" "
Duquesne	C. W. Goldstrohm	" "
Easton	Dr. J. S. Cohen	" "
Ellwood City	Louis Young	" "
Erie	**James R. Smith, M.D.	" "
Ferrell	Benjamin F. Davis	" "
Franklin	C. H. Brown, M.D.	" "

* Member, A.P.H.A. ** Fellow, A.P.H.A.

State and City	Name of Health Officer	Official Title
Pennsylvania (Cont.)		
Greensburg	Joseph B. Cherry	Health Officer
Hanover	Howard P. Knapper	Secretary, Board of Health
Harrisburg	**John M. J. Raunick, M.D.	Health Officer
Hazelton	W. H. Pfaff	" "
Homestead	M. D. Weis	" "
Jeanette	Charles E. Walter	" "
Johnstown	L. W. Jones, M.D.	" "
Kingston	J. F. Seward	" "
Lancaster	Benjamin F. Charles	" "
Latrobe	W. T. Osborne	" "
Lebanon	John D. Bogen, M.D.	" "
Lewistown	H. E. Fetteroff	" "
Mahoney City	Harry Martin	" "
McKeesport	Daniel F. Marsh	" "
McKees Rocks	Mary Dougherty	Secretary, Board of Health
Meadville	John Laley	Health Officer
Monesson	John Lermann	" "
Mount Carmel	Charles F. Cohoon	" "
Munhall	W. J. Caddy	Secretary, Board of Health
Nanticoke	J. H. Abbott	Health Officer
New Castle	*William L. Steen, M.D.	" "
New Kensington	John H. Evans	" "
Norristown	*R. Ronald Dettre	" "
North Braddock	George A. Shepard	" "
Oil City	*W. J. Lewis	" "
Old Forge	Primo Cesare	Chief of Police
Olyphant	Andrew Taras	Borough Health Officer
Philadelphia	*J. Norman Henry, M.D.	Director, Dept. of Public Health
Phoenixville	R. E. Deery	Health Officer
Pittsburgh	*R. P. Moyer, M.D.	Director, Dept. of Public Health
Pittston	Michael A. McHale	Health Officer
Plymouth	H. G. Templeton, M.D.	Secretary, Board of Health
Pottstown	A. John Andre	Health Officer
Pottsville	A. C. Huntzinger	" "
Reading	Ira J. Hain, M.D.	" "
Scranton	Dr. Arthur E. Davis	Director of Public Health
Shamokin	Fred Zeiser	Health Officer
Sharon	J. S. Hildebrand	Sanitary Officer
Shenandoah	Dr. Claude Davis	Health Officer
Steelton	E. G. Butler	" "
Sunbury	Carl P. Inkrote	" "
Swissvale	William H. Rushworth	" "
Tamaqua	Lamont Perrine	" "
Taylor	E. E. Edwards, M.D.	" "
Turtle Creek	Manuel Emmanuel	" "
Uniontown	W. C. Hall	" "
Vandergrift	J. D. Remaley	" "
Warren	Ralph N. Brown	" "
Washington	Thos. W. Henderson	" "
Waynesboro	Percy H. Snowberger	" "
West Chester	W. T. Garrett	Secretary, Board of Health
Wilkes Barre	**C. B. Crittenden, M.D.	Health Officer
Wilkinsburg	J. M. Snyder	" "
Williamsport	William J. Molenkopf	" "
York	J. Frank Small, M.D.	Director of Public Health
Rhode Island		
Bristol	Daniel E. Dwyer	Health Officer
Central Falls	Charles S. Doucet	Superintendent of Health
Cranston	*Daniel S. Latham, M.D.	" " "
East Providence	W. H. T. Hamill	Health Officer
Newport	*Edward V. Murphy, M.D.	Commissioner of Health
North Providence	Herbert A. Brown	Health Officer
Pawtucket	Dr. Albert L. Vandale	Superintendent of Health
Providence	*Michael J. Nestor, M.D.	City Health Officer
Warwick	*L. J. Smith, M.D.	Health Officer
West Warwick	D. S. Harrop, M.D.	" "
Westerly	Samuel C. Webster, M.D.	Superintendent of Health
Woonsocket	Dr. James P. O'Brien	Health Officer

* Member, A.P.H.A. ** Fellow, A.P.H.A.

State and City	*Name of Health Officer*	*Official Title*
South Carolina		
Anderson	**E. E. Epting, M.D.	Commissioner of Health
Charleston	**Leon Banov, M.D.	City & County Health Officer
Columbia	P. E. Payne	Health Officer
Florence	George D. Heath, M.D., Dr.P.H.	Health Commissioner
Greenville	**Irving S. Barksdale, M.D.	Commissioner of Health
Greenwood	Dr. Joseph E. Brodie	Health Officer
Rock Hill	Dr. R. D. Sumner	Medical Officer
Spartanburg	*J. M. Beeler, M.D.	Health Officer
Sumter	Dr. S. R. Kitchen	" "
South Dakota		
Aberdeen	Dr. J. F. Adams	City Health Officer
Huron	Dr. William H. Saxton	City Physician
Mitchell	Dr. E. M. Young	Health Officer
Rapid City	F. J. Austin, M.D.	" "
Sioux Falls	Dr. E. E. Gage	" "
Watertown	Dr. W. G. Magee	City Health Officer
Tennessee		
Bristol	*F. L. Moore, M.D.	Director, County Health Dept.
Chattanooga	Dr. J. W. L. Cooper	Health Officer
Jackson	Dr. Herman Hawkins	City Physician
Johnson City	*Dr. W. L. Poole	County Health Officer
Kingsport	*F. L. Moore, M.D.	Health Officer
Knoxville	*W. H. Enneis, M.D.	" "
Memphis	*L. M. Graves, M.D.	Superintendent of Health
Nashville	*John Overton, M.D.	City Health Officer
Texas		
Abilene	Scott Wingo Hollis, M.D.	City Health Officer
Amarillo	*B. M. Primer	Director, County Health Unit
Austin	*Eugene O. Chimene, M.D.	Director of Public Health
Beaumont	Dr. William W. Dunn	City Health Officer
Big Spring	H. M. Bennett, M.D.	Health Officer
Brownsville	Dr. Thurman A. Kinder, Jr.	City Health Officer
Brownwood	Dr. J. M. Horn	" " "
Cleburne	Dr. Joseph M. Stallicup	" " "
Corpus Christi	Dr. N. D. Carter	" " "
Corsicana	Dr. W. T. Shell, Jr.	" " "
Dallas	**J. W. Bass, M.D.	Director of Public Health
Del Rio	Dr. D. A. York	City Health Officer
Denison	W. A. Lee, M.D.	Health Officer
El Paso	*Dr. T. J. McCamant	Director, City-County Health Unit
Fort Worth	**A. H. Flickwir, M.D.	Health Officer
Galveston	*Walter Kleberg, M.D.	City Health Officer
Greenville	B. F. Arnold, M.D.	Health Officer
Harlingen	Dr. V. M. Bass	" "
Houston	*G. W. Larendon, M.D.	City Health Officer
Laredo	H. M. Austin	" " "
Lubbock	J. W. Rollo	Health Officer
Marshall	Dr. W. H. Bennett	City Health Officer
Palestine	John M. Colley, M.D.	Health Officer
Pampa	... .	" "
Paris	Dr. John A. Stephens	City Health Officer
Port Arthur	Dr. F. J. Beyt	" " "
San Angelo	Dr. B. T. Brown	" " "
San Antonio	**W. A. King, M.D.	Health Officer
San Benito	Dr. Neal D. Monger	City Health Officer
Sherman	Dr. C. D. Strather	Health Officer
Sweetwater	*Ernest W. Prothro, M.D.	Director of Public Health
Temple	Dr. Robert R. Curtis	City Health Officer
Texarkana	Dr. Charles A. Smith	" " "
Tyler	Albert Woldert	" " "
Waco	Dr. R. W. Crosthwait	" " "
Wichita Falls	....	" " "
Utah		
Ogden	Dr. Walter E. Whalen	Director of Health Dept.
Provo	Dr. C. M. Smith	City Physician
Salt Lake City	Dr. Sol Kahn	Health Commissioner

* Member, A.P.H.A. ** Fellow, A.P.H.A.

State and City	*Name of Health Officer*	*Official Title*
Vermont		
Barre	Dr. Michael F. Cerasoli	Health Officer
Bennington	Joseph M. Ayres	" "
Burlington	Erald F. Foster, M.D.	" "
Rutland	*Clare M. Cole, M.D.	" "
Virginia		
Alexandria	W. L. Schafer, M.D.	Health Officer
Charlottesville	*C. Howe Eller, M.D., Dr.P.H.	" "
Danville	R. W. Garnett, M.D.	" "
Hopewell	L. A. Sims	City Engineer
Lynchburg	**Mosby G. Perrow, Ph.D.	Director of Public Welfare
Newport News	*G. Colbert Tyler, M.D.	" " " "
Norfolk	*J. C. Sleet, M.D.	Health Commissioner
Petersburg	*Mason Romaine, M.D.	Health Officer
Portsmouth	**Lonsdale J. Roper, M.D.	Director of Public Welfare
Richmond	**W. Brownley Foster, M.D.	" " " "
Roanoke	*Coleman B. Ransone, M.D.	Health Officer
Staunton	*J. F. Fulton, M.D.	" "
Suffolk	**William F. Wild, M.D.	Director of Health
Winchester	Dr. L. M. Allen	Health Officer
Washington		
Aberdeen	B. O. Swinehart, M.D.	City Health Officer
Bellingham	Dr. O. E. Beebe	" " "
Bremerton	D. H. Polk, M.D.	" " "
Everett	Dr. I. W. Parsons	" " "
Hoquiam	Dr. H. C. Watkins	" " "
Longview	Dr. J. S. McCarthy	Health Officer
Olympia	Dr. W. L. Bridgford	" "
Port Angeles	Will H. Taylor, M.D.	" "
Seattle	*F. M. Carroll, M.D.	Commissioner of Health
Spokane	**Ralph Hendricks, M.D.	Commissioner of Public Affairs
Tacoma	**S. M. Creswell, M.D.	Director of Health
Vancouver	Dr. Clyde B. Hutt	County Health Officer
Walla Walla	**Jerry E. Vanderpool, M.D.	County & City Health Officer
Wenatchee	*C. R. Fargher, M.D.	Health Officer
Yakima	**Lloyd Moffitt, M.D.	County & City Health Officer
West Virginia		
Bluefield	**David B. Lepper, M.D.	Director of Health
Charleston	*Hugh B. Robins, M.D.	Health Commissioner
Clarksburg	Dr. R. L. Osborne	City Health Officer
Fairmont	James A. Jamieson, M.D.	" " "
Huntington	Dr. Gilbert A. Ratcliff	Health Officer
Martinsburg	*C. A. Thomas, M.D.	" "
Morgantown	*R. C. Farrier, M.D.	County Health Officer
Moundsville	*W. G. C. Hill, M.D.	" " "
Parkersburg	**Arthur D. Knott, M.D., Dr.P.H.	City & County Health Officer
Wheeling	*Reece M. Pedicord, M.D.	City Health Commissioner
Wisconsin		
Appleton	Frank P. Dohearty, M.D.	City Health Officer
Ashland	Henry Wolfman	Health Commissioner
Beloit	Dr. R. S. Vivian	Health Officer
Cudahy	Dr. Bernard Krueger	" "
Eau Claire	*L. H. Flynn, M.D.	" "
Fond du Lac	Dr. M. O. Bowdry	" "
Green Bay	H. S. Atkinson, M.D.	Commissioner of Health
Janesville	Fred B. Welch, M.D.	City Health Officer
Kenosha	**Gustave Windesheim, M.D.	Health Officer
La Crosse	*A. M. Murphy	Acting Health Commissioner
Madison	*F. F. Bowman, M.D.	Health Officer
Manitowoc	Dr. George M. Hoffman	Health Commissioner
Marinette	*J. William Boren, M.D.	" "
Milwaukee	**John P. Koehler, M.D.	Commissioner of Health
Oshkosh	Dr. J. J. Kronzer	Health Officer
Racine	**I. F. Thompson, M.D.	" "
Sheboygan	*G. L. Hildebrand, M.D.	Commissioner of Public Health,
Shorewood	*Jerome M. Jekel, M.D.	Health Commissioner

* Member, A.P.H.A. ** Fellow, A.P.H.A.

State and City	*Name of Health Officer*	*Official Title*
Wisconsin (Cont.)		
South Milwaukee	Dr. Robert D. Moray	Health Officer
Stevens Point	*F. R. Krembs, M.D.	Health Commissioner
Superior	Dr. P. G. McGill	" "
Two Rivers	A. P. Zlatnik, M.D.	Health Officer
Watertown	Dr. Felix H. Zimmermann	Health Commissioner
Waukesha	Frank M. Scheele, M.D.	Health Officer
Wausau	*L. F. Bugbee	" "
Wauwatosa	Dr. Roy T. Hansen	" "
West Allis	*Dr. Charles S. Stern	Health Commissioner
Wyoming		
Casper	Dr. J. C. Kamp	Health Officer
Cheyenne	Dr. H. R. Dillman	City Health Officer

* Member, A.P.H.A. ** Fellow A.P.H.A.

Full-time County Health Officers (540)

(As of February 1, 1936)

The United States Public Health Service list published in 1935 is the basis of the following. The variations represent later information received by the American Public Health Association through correspondence.

State and County	*Name of Health Officer*	*Post Office*	*Official Title*
Alabama			
Autuga	Dr. E. L. Trammell	Prattville	County health officer
Baldwin	Dr. S. A. Durick	Bay Minette	" " "
Barbour	E. M. Moore, M.D.	Clayton	" " "
Blount	*S. D. Sturkie, M.D.	Oneonta	" " "
Bullock	Dr. H. E. Barker	Union Springs	" " "
Calhoun	George A. Cryer, M.D.	Anniston	" " "
Chambers	Dr. W. J. Donald	Lafayette	" " "
Cherokee	*S. C. Tatum, M.D.	Center	" " "
Chilton	*Dr. J. M. Kimmey	Clanton	" " "
Cleburne	F. R. Wood, M.D.	Heflin	" " "
Colbert	Dr. G. W. Warrick	Tuscumbia	" " "
Conecuh	E. L. Kelly, M.D.	Evergreen	" " "
Covington	Dr. C. D. McLeod	Andalusia	" " "
Crenshaw	J. O. Foster, M.D.	Luverne	" " "
Cullman	*M. S. Whiteside, M.D.	Cullman	" " "
Dale	William L. Orr, M.D.	Ozark	" " "
Dallas	*L. Tennent Lee, M.D.	Selma	" " "
Elmore	Dr. C. S. Cotlin, Jr.	Wetumpka	" " "
Escambia	Dr. E. F. Goldsmith	Brewton	" " "
Etowah	*C. L. Murphree, M.D.	Gadsden	" " "
Franklin	N. P. Underwood, M.D.	Russellville	" " "
Houston	*F. G. Granger, M.D.	Dothan	" " "
Jackson	Dr. George E. Newton	Scottsboro	" " "
Jefferson	*J. D. Dowling, M.D.	Birmingham	" " "
Lamar	*Dr. W. J. B. Owings	Vernon	" " "
Lauderdale	*W. D. Hubbard, M.D.	Florence	" " "
Lawrence	R. E. Harper, M.D.	Moulton	" " "
Lee	H. C. McRee, M.D.	Opelika	" " "
Limestone	*Dr. W. A. Minsch	Athens	" " "
Lowndes	Dr. E. F. Leatherwood	Hayneville	" " "
Macon	Murray Smith, M.D.	Tuskegee	" " "
Madison	W. C. Hatchett, M.D.	Huntsville	" " "
Marengo	*E. T. Norman, M.D.	Linden	" " "
Marion	*W. T. Burkett, M.D.	Hamilton	" " "
Marshall	Dr. Lee Weathington	Guntersville	" " "
Mobile	*O. L. Chason, M.D.	Mobile	" " "
Monroe	*R. D. Neal, M.D.	Monroeville	" " "
Montgomery	*J. L. Bowman, M.D.	Montgomery	County & city health officer
Morgan	*L. R. Murphree, M.D.	Decatur	County health officer
Perry	J. R. Long, M.D.	Marion	" " "
Pickens	Dr. J. J. Croley	Carrollton	" " "
Pike	W. H. Abernethy, M.D.	Troy	" " "
Randolph	Dr. M. R. McWhorter	Wedowee	" " "
Russell	Dr. M. L. Shaddix	Phenix City	" " "
Shelby	Dr. H. C. Nickson	Columbiana	" " "
Sumter	Dr. S. J. Williams	Livingston	" " "
Talladega	J. H. Hill, M.D.	Talladega	" " "
Tallapoosa	C. C. Fargason, M.D.	Dadeville	" " "
Tuscaloosa	Dr. A. A. Kirk	Tuscaloosa	" " "
Walker	A. M. Waldrop, M.D.	Jasper	" " "
Washington	I. C. Sumner, M.D.	Chatom	" " "
Wilcox	E. L. McIntosh, M.D.	Camden	" " "
Winston	Dr. S. W. Shelton	Double Springs	" " "
Arizona			
Cochise	**R. B. Durfee, M.D.	Bisbee	County Supt. of P. H.
Gila	*Geoffrey Morris, M.D.	Globe	County health officer
Maricopa	**A. N. Crain, M.D.	Phoenix	" " "
Pima	*Lewis H. Howard, M.D.	Tucson	" " "

* Member, A.P.H.A. ** Fellow, A.P.H.A.

State and County	*Name of Health Officer*	*Post Office*	*Official Title*
Arkansas			
Ashley	*A. M. Gibbs, M.D.	Hamburg	County health officer
Clark	T. T. Ross, M.D.	Arkadelphia	" " "
Conway	A. B. Jemison, M.D.	Morrilton	Medical director
Crittenden	*B. M. Stevenson, M.D.	Marion	County health officer
Cross	J. L. Griffin, M.D.	Wynne	Medical director
Faulkner	Marcus T. Smith, M.D.	Conway	County health officer
Garland	J. F. Merritt, M.D.	Hot Springs	City health officer
Jackson	*M. B. Owens, M.D.	Newport	Medical director
Jefferson	W. H. Bruce, M.D.	Pine Bluff	Director of health dept.
Little River	J. W. Ringgold, M.D.	Ashdown	County health officer
Lonoke-Prairie-Arkansas	W. Myers Smith, M.D.	Lonoke	" " "
Mississippi	*Arthur M. Washburn, M.D.	Blytheville	" " "
Monroe	Dr. W. T. Scarlett	Clarendon	" " "
Ouachita	R. C. Kennerly, M.D.	Camden	" " "
Phillips	W. B. Bruce, M.D.	Helena	Medical director
Pope	A. B. Tate, M.D.	Russellville	" "
Pulaski	*J. A. Summers, M.D.	Little Rock	County health officer
Saline	Dr. D. W. Fulmer	Benton	" " "
Sebastian	*J. E. Johnson, M.D.	Fort Smith	" " "
Woodruff	J. F. Hays, M.D.	Augusta	" " "
Yell	*T. J. Pool, M.D.	Ola	Medical director
California			
Alameda	**I. O. Church, M.D.	Oakland	County health officer
Contra Costa	*W. A. Powell, M.D.	Martinez	" " "
Fresno	*William F. Stein, M.D.	Fresno	" " "
Imperial	**Warren F. Fox, M.D.	El Centro	" " "
Kern	*Dr. Joe Smith	Bakersfield	" " "
Los Angeles	**J. L. Pomeroy, M.D.	Los Angeles	" " "
Madera	*Lee A. Stone, M.D.	Madera	" " "
Monterey	**Roy M. Fortier, M.D.	Salinas	" " "
Orange	*K. H. Sutherland, M.D.	Santa Ana	" " "
Riverside	*W. A. Jones, M.D.	Riverside	Commissioner of health
San Bernardino	*E. F. Godfrey, M.D.	San Bernardino	County health officer
San Joaquin	**John J. Sippy, M.D.	Stockton	" " "
San Diego	*Alex. M. Lesem, M.D.	San Diego	" " "
San Luis Obispo	**Allen F. Gillihan, M.D.	San Luis Obispo	" " "
San Mateo	*Charles C. Gans, M.D.	San Mateo	" " "
Santa Barbara	**R. C. Main, M.D.	Santa Barbara	" " "
Santa Clara	**C. M. Burchfield, M.D.	San Jose	" " "
Stanislaus	*E. F. Reamer, M.D.	Modesto	" " "
Ventura	Dr. A. A. Maulhardt	Ventura	" " "
Delaware			
Kent	*E. F. Smith, M.D.	Dover	County health officer
New Castle	*J. R. Downes, M.D.	Newark	" " "
Sussex	*Dr. F. I. Hudson	Georgetown	" " "
Florida			
Escambia	**W. H. Pickett, M.D.	Pensacola	County health officer
Jackson	Dr. Paul G. Shell	Mariana	" " "
Leon	L. J. Graves, M.D.	Tallahassee	" " "
Georgia			
Baldwin	O. F. Moran, M.D.	Milledgeville	Commissioner of health
Bartow	*A. C. Shamblin, M.D.	Cartersville	County health officer
Bibb	*J. D. Applewhite, M.D.	Macon	" " "
Brooks	....	Quitman	" " "
Chatham	**Victor H. Bassett, M.D.	Savannah	" " "
Clarke	*W. W. Brown, M.D.	Athens	Health commissioner
Cobb	J. E. Lester, M.D.	Marietta	Commissioner of health
Colquitt	T. H. Chestnut, M.D.	Moultrie	County health officer
Decatur	M. A. Fort, M.D.	Bainbridge	" " "
DeKalb	J. R. Evans, M.D.	Decatur	" " "
Dougherty	Hugo Robinson, M.D.	Albany	Health commissioner
Floyd	B. V. Elmore, M.D.	Rome	Commissioner of health
Fulton	W. N. Gilbert, M.D.	Atlanta	County health officer
Glynn, McIntosh, Camden	**M. E. Winchester, M.D.	Brunswick	Commissioner of health
Grady	Dr. Howard L. Rankin	Cairo	County health officer
Hall	C. J. Wellborn, M.D.	Gainesville	" " "

* Member, A.P.H.A. ** Fellow, A.P.H.A.

State and County	Name of Health Officer	Post Office	Official Title
Georgia (Cont.)			
Jefferson	L. R. Bryson, M.D.	Louisville	County health officer
Jenkins	Hugh B. Senn, M.D.	Millen	" " "
Laurens	O. H. Cheek, M.D.	Dublin	Commissioner of health
Lowndes	G. T. Crozier, M.D.	Valdosta	County health officer
Mitchell	C. O. Rainey, M.D.	Camilla	Commissioner of health
Richmond	**H. Grady Callison, M.D.	Augusta	County health officer
Spalding	W. C. Humphries, M.D.	Griffin	" " "
Sumter	Dr. A. J. Davis	Americus	Commissioner of health
Thomas	James R. Dykes, M.D.	Thomasville	" " "
Troup	S. C. Rutland, M.D.	La Grange	" " "
Ware	*George E. Atwood, M.D.	Waycross	County health officer
Washington	*O. L. Rogers, M.D.	Sandersville	" " "
District Health Unit No. 1 Catoosa Walker	*C. W. Folsom, M.D.	Lafayette	Commissioner of health
Indiana			
Lake	*William D. Weis, M.D.	Crown Point	County health officer
Iowa			
Woodbury	*W. S. Petty, M.D.	Sioux City	Field Agent, U.S.P.H.S.
Kansas			
Lyon	C. Herbert Munger, M.D.	Emporia	County health officer
Sedgwick	*J. C. Montgomery, M.D.	Wichita	" " "
Shawnee	*F. E. McCord, M.D.	Topeka	" " "
Kentucky			
Adair	N. A. Mercer, M.D.	Columbia	County health officer
Allen	C. W. Holland, M.D.	Scottsville	" " "
Anderson	*S. R. Boggess, M.D.	Lawrenceburg	" " "
Ballard	Dr. Charles B. Billington	Wickliffe	" " "
Barren	....	Glasgow	" " "
Bath	J. S. Goodpaster, M.D.	Owingsville	" " "
Bell	Dr. Adam Stacy, Jr.	Pineville	" " "
Boyd	Dr. Lee A. Dare	Ashland	Director of health
Breathitt	Dr. Earl E. Gambill	Jackson	County health officer
Butler	C. C. Threlkel, M.D.	Morgantown	" " "
Caldwell	Dr. B. K. Amos	Princeton	" " "
Calloway	James A. Outland, M.D.	Murray	" " "
Carlisle	J. F. Harrell, M.D.	Bardwell	Director, Co. H.D.
Carter	Dr. Don E. Wilder	Grayson	" " "
Casey	*J. W. Scudder, M.D.	Liberty	County health officer
Clay	Dr. L. H. Wagers	Manchester	" " "
Clinton	Dr. W. G. Morgan	Albany	" " "
Edmonson	Dr. H. H. Bishop	Brownsville	" " "
Elliott	Dr. R. E. Wehr	Sandy Hook	" " "
Estill	Dr. R. R. Snowden	Irvine	Director, Co. H.D.
Fayette	Dr. Charles O. Cawood	Lexington	County health officer
Fleming	Dr. C. W. Christine	Flemingsburg	" " "
Floyd	Marvin Ransdell, M.D.	Prestonburg	Director, Co. H.D.
Fulton	Hugh E. Prather, M.D.	Hickman	Director of health
Gallatin	Dr. J. W. Miller	Warsaw	County health officer
Grant	N. H. Ellis, M.D.	Williamstown	" " "
Grayson	Dr. J. G. Samuels, Jr.	Leitchfield	" " "
Green	Dr. J. M. Dishman	Greensburg	" " "
Greenup	*Dr. C. M. Gambill	Greenup	" " "
Hart	Charles P. Shields, M.D.	Munfordsville	" " "
Henderson	Dr. J. Leland Tanner	Henderson	" " "
Hickman	Charles Hunt, M.D.	Clinton	Director, Co. H.D.
Hopkins	*C. R. Morton, M.D.	Madisonville	" " "
Jefferson	*J. D. Trawick, M.D.	Louisville	County health officer
Kenton	H. C. White, M.D.	Covington	" " "
Knott	*J. W. Duke, M.D.	Hindman	" " "
Knox	*W. V. Bradshaw, Jr., M.D.	Barbourville	" " "
Laurel	*G. S. Brock, M.D.	London	" " "
Lawrence	W. C. Gose, M.D.	Louisa	Director, Co. H.D.
Lee	E. M. Brown, M.D.	Beattyville	County health officer
Leslie	Dr. D. D. Turner	Hyden	" " "

* Member, A.P.H.A. ** Fellow A.P.H.A.

State and County	*Name of Health Officer*	*Post Office*	*Official Title*
Kentucky (Cont.)			
Letcher	Dr. H. A. Shields	Whitesburg	County health officer
Lincoln	Dr. K. T. Johnstone	Stanford	" " "
Lyon	Dr. N. M. Atkins	Eddyville	" " "
McCracken	....	Paducah	" " "
McCreary	Dr. Wallace M. Chapman	Whitley City	" " "
McLean	*G. L. Thompson, M.D.	Calhoun	Director, Co. H.D.
Madison	Dr. H. G. Wells	Richmond	County health officer
Magaffin	Dr. H. K. Bailey	Salyersville	Director, Co. H.D.
Marshall	S. L. Henson, M.D.	Benton	County health officer
Martin	William N. Keith, M.D.	Inez	Director, Co. H.D.
Mason	*O. M. Goodloe, M.D.	Maysville	County health officer
Meade	O. R. Lynch, M.D.	Brandenburg	" " "
Menifee	E. T. Riley, M.D.	Frenchburg	Director, Co. H.D.
Metcalfe	Dr. H. T. Carter	Edmonton	County health officer
Monroe	Dr. A. S. Yates	Tompkinsville	" " "
Muhlenberg	Roy M. Orsburn, M.D.	Greenville	" " "
Nicholas	Dr. E. W. Atherton	Carlisle	" " "
Ohio	A. D. Park, M.D.	Hartford	" " "
Owsley	Dr. J. R. Aker	Booneville	Director, Co. H.D.
Perry	*D. D. Carr, M.D.	Hazard	County health officer
Pike	R. E. Teague, M.D.	Pikeville	" " "
Powell	Dr. S. T. Scrivner	Stanton	" " "
Pulaski	*D. A. Reekie, M.D.	Somerset	" " "
Rockcastle	Walker Owens, M.D.	Mt. Vernon	" " "
Rowan	*T. A. E. Evans, M.D.	Morehead	" " "
Scott	Dr. R. J. Griffin	Georgetown	Director of health
Spencer	Dr. M. W. Caskey	Taylorsville	County health officer
Todd	L. A. Crosby, M.D.	Elkton	" " "
Trigg	Dr. E. W. Sigler	Cadiz	" " "
Trimble	*J. J. Gerkins, M.D.	Bedford	" " "
Union	Dr. A. Y. Covington	Morganfield	" " "
Warren	*G. M. Wells, M.D.	Bowling Green	" " "
Wayne	Mack Roberts, M.D.	Monticello	" " "
Webster	C. M. Smith, M.D.	Dixon	Director, Co. H.D.
Wolfe	Dr. J. L. Cox	Campton	" " "
Louisiana			
Acadia	*J. D. Hunter, M.D.	Crowley	County health officer
Assumption	**P. M. Payne, M.D.	Napoleonville	Director of health
Avoyelles	Dr. L. W. Holloman	Marksville	Acting director of health
Caddo	*W. J. Sandidge, M.D.	Shreveport	Director of health
Caldwell	Thomas Burke, M.D.	Columbia	" " "
Catahoula	L. C. Spencer, M.D.	Harrisburg	" " "
Claiborne	*H. R. Marlatt, M.D.	Homer	County health officer
Concordia	John Schreiber, M.D.	Vidalia	" " "
De Soto	*R. A. Tharp, M.D.	Mansfield	Director of health
East Carroll	Dr. F. V. Boyd	Lake Providence	County health officer
Franklin	R. E. Applewhite, M.D.	Winnsboro	Director of health
Iberia	B. L. Stinson, M.D.	New Iberia	" " "
Iberville	*J. C. Eby, M.D.	Plaquemine	County health officer
Lafayette	A. J. Comeaux, M.D.	Lafayette	Director of health
Lafourche	H. S. Smith, M.D.	Thibodaux	" " "
La Salle	E. L. Miller, M.D.	Jena	" " "
Lincoln	R. H. Allen, M.D.	Ruston	County health officer
Madison	E. S. Freeman, M.D.	Tallulah	" " "
Morehouse	N. P. Liles, M.D.	Bastrop	Director of health
Natchitoches	*W. W. Knipmeyer, M.D.	Natchitoches	" " "
Ouchita	G. D. Williams, M.D.	Monroe	" " "
Pointe Coupee	*F. F. Rougon, M.D.	New Roads	County health officer
Rapides	*B. J. Aymond, M.D.	Alexandria	" " "
Red River	*Bernard Hochfelder, M.D.	Coushatta	" " "
Richland	R. O. C. Green, M.D.	Rayville	Co. director of health
St. Landry	Dr. L. A. Masterson	Opelousas	County health officer
St. Martin	P. H. Fleming, M.D.	St. Martinsville	Co. director of health
St. Mary	Dr. W. W. Poimboeuf	Franklin	Director of health
Tensas	*J. G. Norris, M.D.	St. Joseph	County health officer
Terrebonne	M. F. Houston, M.D.	Houma	" " "
Washington	F. A. Williams, M.D.	Franklinton	Director of health
Webster	*W. C. Summer, M.D.	Minden	" " "
West Carroll	Dr. F. S. Williams	Oak Grove	" " "

* Member, A.P.H.A. ** Fellow A.P.H.A.

State and County	Name of Health Officer	Post Office	Official Title
Maine			
Cooperative Health Union	**B. L. Arms, M.D.	Farmington	County health officer
Motbov Union	H. L. Jackson, M.D.	Old Town	Health officer
Maryland			
Allegany	J. P. Franklin, M.D.	Cumberland	County health officer
Anne Arundel	*John H. Janney, Jr., M.D.	Annapolis	" " "
Baltimore	*J. S. Bowen, M.D.	Towson	" " "
Calvert	*I. N. King, M.D.	Prince Frederick	" " "
Caroline	*Louis S. Welty, M.D.	Denton	" " "
Carroll	W. C. Stone, M.D.	Westminster	" " "
Cecil	*C. A. Kane, M.D.	Elkton	" " "
Charles	....	La Plata	" " "
Dorchester	**E. A. Jones, M.D.	Cambridge	" " "
Frederick	*E. C. Kefauver, M.D.	Frederick	" " "
Garrett	*Eugene C. Peck, M.D.	Oakland	" " "
Harford	*T. A. Callahan, M.D.	Bel Air	" " "
Howard	*William J. French, M.D.	Ellicott City	" " "
Kent	**R. G. Beachley, M.D., D.P.H.	Chestertown	" " "
Montgomery	**V. L. Ellicott, M.D., Dr.P.H.	Rockville	" " "
Prince Georges	*A. B. Hooton, M.D.	Upper Marlboro	" " "
Queen Annes	James A. McCallum, M.D.	Centreville	" " "
St. Marys	Dr. D. St. Clair Campbell	Leonardtown	" " "
Somerset	Robert H. Johnson, M.D.	Princess Anne	" " "
Talbot	*George C. Halley, M.D.	Easton	" " "
Washington	W. Ross Cameron, M.D.	Hagerstown	" " "
Wicomico	*Seth H. Hurdle, M.D.	Salisbury	" " "
Worcester	*Bradford Massey, M.D.	Pocomoke	" " "
Massachusetts			
Barnstable	*A. P. Goff, M.D.	Hyannis	County health officer
Nashoba District	*James O. Wails, M.D.	Ayer	Medical director
Southern Berkshire District	**H. W. Stevens, M.D.	Great Barrington	Medical director
Michigan			
Allegan	Dr. S. E. Beckett	Allegan	County health officer
Barry	*Robert B. Harkness, M.D.	Hastings	" " "
Branch	*Dr. F. S. Leeder	Coldwater	" " "
Calhoun	*Dr. M. R. Kinde	Marshall	" " "
Eaton	*J. W. Davis, M.D.	Charlotte	" " "
Genesee	Dr. T. E. Gibson	Flint	" " "
Hillsdale	*Dr. E. G. McGavran	Hillsdale	" " "
Isabella	*Dr. F. R. Town	Mount Pleasant	" " "
Kent	*J. D. Brook, M.D.	Grand Rapids	" " "
Midland	**Dr. David Littlejohn	Midland	" " "
Oakland	**John D. Monroe, M.D.	Pontiac	" " "
Ottawa	*Ralph Ten Have, M.D.	Grand Haven	" " "
Saginaw	**V. K. Volk, M.D.	Saginaw	" " "
Van Buren	*Theodore R. Meyer, M.D.	Paw Paw	" " "
Wexford	*S. C. Moore, M.D.	Cadillac	" " "
District No. 1	*T. R. Laughbaum, M.D.	Lake City	" " "
District Health Unit	*Guy R. Post, M.D.	White Cloud	" " "
District Health Unit	Dr. Gladys Kleinschmidt	West Branch	" " "
District Health Unit	*Carlteton Dean, M.D.	Charlevoix	" " "
District Health Unit	*Dr. Gordon B. Moffat	Rogers City	" " "
District Health Unit	**Clarence D. Hart, M.D.	Newberry	" " "
District Health Unit	**Edward V. Thiehoff, M.D.	Gladwin	" " "
Minnesota			
St. Louis	*C. A. Scherer, M.D.	Duluth	County health officer
Mississippi			
Adams	*A. R. Perry, M.D.	Natchez	County health officer
Bolivar	*R. D. Dedwylder, M.D.	Cleveland	Director of health
Calhoun	F. L. McGahey	Calhoun City	County health officer
Coahoma	*N. C. Knight, M.D.	Clarksdale	" " "
Copiah	*J. C. McGuire, M.D.	Hazlehurst	" " "
Forrest	*B. D. Blackwelder, M.D.	Hattiesburg	" " "
Hancock	C. M. Shipp, M.D.	Bay St. Louis	Director of health
Harrison	D. J. Williams, M.D.	Gulfport	County health officer

* Member, A.P.H.A. ** Fellow A.P.H.A.

State and County	*Name of Health Officer*	*Post Office*	*Official Title*
Mississippi (Cont.)			
Hinds	W. E. Noblin, M.D.	Jackson	County health officer
Holmes	Dr. C. C. Smith	Lexington	" " "
Humphreys	*J. W. Barkley, M.D.	Belzoni	Director of health
Jackson	*R. G. Lander, M.D.	Pascagoula	" " "
Lamar	J. N. Mason, M.D.	Purvis	County health officer
Lauderdale	*D. V. Galloway, M.D.	Meridian	" " "
Leake	Dr. W. S. Martin	Carthage	" " "
Lee	*W. H. Cleveland, M.D.	Tupelo	" " "
Leflore	*L. A. Barnett, M.D.	Greenwood	Director of health
Lincoln	*W. R. May, M.D.	Brookhaven	County health officer
Monroe	*C. H. Love, M.D.	Aberdeen	" " "
Newton	Dr. William A. McMahen	Union	" " "
Panola	Albert P. Alexander	Como	" " "
Pearl River	G. E. Godman, M.D.	Poplarville	Director of health
Pike	**T. Paul Haney, Jr., M.D.	McComb	County health officer
Sharkey	A. K. Barrier, M.D.	Rolling Fork	" " "
Sunflower	*H. B. Cottrell, M.D.	Indianola	" " "
Tallahatchie	Dr. G. T. Biles	Sumner	" " "
Union	*Irvin B. Trapp, M.D.	New Albany	" " "
Warren	*F. Michael Smith, M.D.	Vicksburg	Director
Washington	*J. W. Shackelford, M.D.	Greenville	County health officer
Winston	Dr. H. B. Watkins	Noxapater	" " "
Yazoo	*Hugh L. McCalip, M.D.	Yazoo City	" " "
Missouri			
Buchanan	*W. S. Hull, M.D.	St. Joseph	County health officer
Dunklin	*Wheeler Davis, M.D.	Kennet	" " "
Greene	*R. L. Russell, M.D.	Springfield	" " "
Jackson	*J. T. Brennan, M.D.	Independence	" " "
Marion	*Eugene M. Lucke, M.D.	Hannibal	Field agent
Miller	*L. M. Garner, M.D.	Tuscumbia	County health officer
New Madrid	William N. O'Bannon, M.D.	New Madrid	" " "
Pemiscot	Fred L. Ogilvie, M.D.	Caruthersville	" " "
St. Louis	*L. C. Obrock, M.D.	Clayton	" " "
Montana			
Cascade	**F. L. Watkins, M.D.	Great Falls	County health officer
Gallatin	*A. D. Brewer, M.D.	Bozeman	" " "
Missoula	**F. D. Pease, M.D.	Missoula	Health officer
New Mexico			
District I	*E. F. McIntyre	Santa Fe	District health officer
District II	*E. B. Beaver, M.D.	Gallup	" " "
District III	**J. R. Scott, M.D.	Albuquerque	" " "
District IV	**C. W. Gerber, M.D.	Las Cruces	" " "
District V	**W. W. Johnston, M.D.	Las Vegas	" " "
District VI	*O. E. Puckett, M.D.	Carlsbad	" " "
District VII	F. W. Parker, M.D.	Silver City	" " "
District VIII	*J. O. Long, M.D.	Los Lunas	" " "
District IX	*Frank C. Diver, M.D.	Raton	" " "
District X	*Leonard A. Dewey	Clovis	" " "
New York			
Cattaraugus	**Henry R. O'Brien, M.D.	Olean	Commissioner of health
Columbia	*Louis Van Hoesen, M.D.	Hudson	" " "
Cortland	**Merle R. French, M.D.	Cortland	" " "
Suffolk	*Arthur T. Davis, M.D.	Riverhead	" " "
Westchester	**Matthias Nicoll, Jr., M.D.	White Plains	" " "
District			
Fulton-Montgomery	*J. E. Perkins, M.D., D.P.H.	Amsterdam	Asst. dist. state health off.
Tompkins	**V. A. Van Volkenburgh	Ithaca	" " " " "
North Carolina			
Avery-Watauga-Yancey	Dr. C. H. White	Burnsville	County health officer
Beaufort	D. E. Ford, M.D.	Washington	" " "
Bladen	R. S. Cromartie, M.D.	Elizabethtown	" " "
Buncombe	*H. L. Sumner, M.D.	Asheville	" " "
Cabarrus	*Daniel G. Caldwell, M.D.	Concord	" " "
Columbus	Floyd Johnson, M.D.	Whiteville	" " "

* Member, A.P.H.A. ** Fellow A.P.H.A.

State and County	*Name of Health Officer*	*Post Office*	*Official Title*
North Carolina (Cont.)			
Cumberland	M. T. Foster, M.D.	Fayetteville	County health officer
Davidson	*G. C. Gambrell, M.D.	Lexington	" " "
Durham	**Jesse H. Epperson	Durham	" " "
Edgecombe	*A. D. Gregg, M.D.	Tarboro	" " "
Forsyth	*J. R Hege, M.D.	Winston-Salem	" " "
Franklin	Dr. R. L. Yarborough	Louisburg	" " "
Gaston	*R. E. Rhyne, M.D.	Gastonia	" " "
Granville	*J. A. Morris, M.D.	Oxford	" " "
Guilford	R. M. Buie, M.D.	Greensboro	" " "
Halifax	*R. S. McGeachy, M.D.	Weldon	" " "
Haywood-Jackson-Swain	Dr. C. N. Sisk	Waynesville	" " "
Hyde	Dr. S. V. Lewis	Ocracoke	" " "
Lenoir	*Z. V. Moseley, M.D.	Kinston	" " "
Mecklenburg	*E. H. Hand, M.D.	Charlotte	" " "
Moore	*John Symington, M.D.	Carthage	" " "
Nash	*T. O. Coppedge, M.D.	Nashville	" " "
New Hanover	*A. H. Elliot. M.D.	Wilmington	" " "
Northampton	M. H. Seawell, M.D.	Jackson	" " "
Orange-Person Dist.	Dr. M. H. Rourk	Hillsboro	" " "
Pitt	Dr. N. T. Ennett	Greenville	" " "
Randolph	*G. H. Sumner, M.D.	Asheboro	" " "
Richmond	*B. B. Dalton, M.D.	Rockingham	" " "
Roberson	*E. R. Hardin, M.D.	Lumberton	" " "
Rowan	**Charles W. Armstrong, M.D.	Salisbury	" " "
Rutherford	*R. M. Bardin, M.D.	Rutherfordton	" " "
Sampson	Dr. W. P. Starling	Clinton	" " "
Surry	Dr. R. J. Sykes	Mount Airy	" " "
Vance	*Z. P. Mitchell, M.D.	Henderson	" " "
Wake	*A. C. Bulla, M.D.	Raleigh	Health officer
Wayne	G. F. Reeves, M.D.	Goldsboro	County health officer
Wilkes	A. J. Eller, M.D.	Wilkesboro	" " "
Wilson	*W. H. Anderson, M.D.	Wilson	" " "
Ohio			
Butler	*C. J. Baldridge, M.D.	Hamilton	Commissioner of health
Clinton	W. K. Ruble, M.D.	Wilmington	Dist. health commissioner
Coshocton	Dr. W. A. McMichael	Coshocton	" " "
Crawford	*G. T. Wasson, M.D.	Bucyrus	" " "
Cuyahoga	*Robert Lockhart, M.D.	Cleveland	" " "
Darke	*W. D. Bishop, M.D.	Greenville	County health officer
Delaware	B. B. Barber, M.D.	Delaware	" " "
Erie	*F. M. Houghtaling, M.D.	Sandusky	Health commissioner
Fayette	*James F. Wilson, M.D.	Washington Court House	Dist. health commissioner
Hamilton	*E. H. Schoenling, M.D.	Cincinnati	County health officer
Hancock	S. F. Whisler, M.D.	Findlay	Dist. health commissioner
Hocking	W. B. Lacock, M.D.	Logan	" " "
Huron	B. C. Pilkey, M.D.	Norwalk	" " "
Jefferson	J. P. Young, M.D.	Steubenville	" " "
Lorain	**F. R. Dew, M.D.	Oberlin	County health officer
Lucas	Dr. C. W. Mahoney	Toledo	" " "
Mahoning	*G. Y. Davis, M.D.	Youngstown	Dist. health commissioner
Marion	*N. Sifritt, M.D.	Marion	County health officer
Medina	*John L. Jones, M.D.	Medina	" " "
Meigs	W. S. Ellis, M.D.	Pomeroy	Dist. health commissioner
Mercer	F. E. Ayers, M.D.	Celina	" " "
Miami	*E. R. Hiatt, M.D.	Troy	" " "
Montgomery	*H. H. Pansing, M.D.	Dayton	" " "
Perry	F. J. Crosbie, M.D.	New Lexington	" " "
Preble	J. I. Nisbet, M.D.	Eaton	County health officer
Richland	*M. C. Hanson, M.D.	Mansfield	" " "
Ross	*R. E. Bower, M.D.	Chillicothe	Dist. health commissioner
Scioto	*G. W. Fishbaugh, M.D.	Portsmouth	County health officer
Seneca	J. J. Heaton, M.D.	Tiffin	Dist. health commissioner
Shelby	*A. B. Lippert, M.D.	Sidney	" " "
Stark	Floyd Stamp, M.D.	Canton	" " "
Summit	**R. H. Markwith, M.D.	Akron	" " "
Trumbull	L. A. Connell, M.D.	Warren	" " "
Tuscarawas	**Joseph Blickensderfer, M.D.	New Philadelphia	" " "
Washington	A. G. Sturgiss, M.D.	Marietta	" " "

* Member, A.P.H.A. ** Fellow A.P.H.A.

State and County	Name of Health Officer	Post Office	Official Title
Ohio (Cont.)			
Wayne	*W. G. Rhoten, M.D.	Wooster	City & county health officer
Wood	*H. J. Powell, M.D.	Bowling Green	Dist. health commissioner
Oregon			
Jackson	*A. N. Johnson, M.D.	Medford	County health officer
Klamath	G. S. Newson, M.D.	Klamath Falls	" " "
Lane	R. C. Romig, M.D.	Eugene	" " "
Marion	*Vernon Douglas, M.D.	Salem	" " "
Multnomah	Dr. H. R. Cliff	Portland	" " "
South Carolina			
Aiken	J. T. Hair, M.D.	Aiken	County health officer
Anderson	**E. E. Epting, M.D.	Anderson	" " "
Beaufort	Dr. William A. Carrigan	Beaufort	" " "
Berkeley	*W. K. Fishburne, M.D.	Moncks Corner	" " "
Charleston	**Leon Banov, M.D.	Charleston	" " "
Cherokee	*E. P. White, M.D.	Gaffney	" " "
Darlington	*G. B. Edwards, M.D.	Darlington	" " "
Dillon-Marion	G. E. McDaniel, M.D.	Dillon	" " "
Dorchester	Dr. B. M. Montgomery	St. George	" " "
Fairfield	J. L. Bryson, M.D.	Winnsboro	" " "
Florence	J. R. Claussen, M.D.	Florence	" " "
Georgetown	S. S. Simons, M.D.	Georgetown	" " "
Greeneville	*Baylis Earle, M.D.	Greenville	" " "
Greenwood	J. E. Brodie, M.D.	Greenwood	" " "
Horry	....	Conway	" " "
Kershaw	A. W. Humphries, M.D.	Camden	" " "
Newberry	H. B. Senn, M.D.	Newberry	" " "
Oconee	*B. F. Sloan, M.D.	Walhalla	" " "
Orangeburg	G. C. Bolin, M.D.	Orangeburg	" " "
Pickens	*W. B. Furman, M.D.	Pickens	" " "
Richland	*R. W. Ball, M.D.	Columbia	" " "
Spartanburg	*J. Moss Beeler, M.D.	Spartanburg	" " "
Tennessee			
Blount	O. F. Agee, M.D.	Maryville	County health officer
Bradley	*C. C. Sanford, M.D.	Cleveland	" " "
Davidson	*J. J. Lentz, M.D.	Nashville	" " "
Gibson	*F. L. Roberts, M.D.	Trenton	" " "
Giles	*Dr. J. U. Speer	Pulaski	" " "
Greene	*R. S. Cowles, M.D.	Greeneville	" " "
Grundy	*V. B. Bowden, M.D.	Pelham	" " "
Hamilton	J. C. Eldridge, M.D.	Chattanooga	" " "
Hardeman	*R. L. Cobb, M.D.	Bolivar	" " "
Hardin	*J. W. Erwin, M.D.	Savannah	" " "
Humphreys	Dr. S. D. Aycock	Waverly	" " "
Knox	*A. G. Hufstedler, M.D.	Knoxville	" " "
Lake	James P. Moon, M.D.	Tiptonville	Director of health
Lauderdale	*R. B. Griffin, M.D.	Ripley	County health officer
Lincoln	*M. F. Brown, M.D	Fayetteville	" " "
Maury	*H. C. Busby, M.D.	Columbia	" " "
Monroe	**David M. Cowgill, M.D.	Madisonville	" " "
Montgomery	F. J. Malone, M.D.	Clarksville	" " "
Obion	*W. B. Harrison, M.D.	Union City	" " "
Roane	*J. C. Fly, M.D.	Kingston	" " "
Rutherford	*J. B. Black, M.D.	Murfreesboro	" " "
Sevier	Dr. R. C. Kash	Sevierville	" " "
Shelby	*W. P. Moore, M.D.	Memphis	" " "
Sullivan	*F. L. Moore, M.D.	Blountville	" " "
Sumner	*H. M. Kelso, M.D.	Gallatin	Health officer
Tipton	A. J. Butler, M.D.	Covington	County health officer
Washington	*Dr. W. L. Poole	Jonesboro	Health officer
Weakley	*M. D. Ingram, M.D.	Dresden	County health officer
Williamson	*R. K. Galloway, M.D.	Franklin	" " "
Wilson	*B. W. Patton, M.D.	Lebanon	" " "
Districts			
Anderson-Campbell	*R. B. Howard, M.D.	Clinton	" " "
Carter-Unicoi	....	Elizabethton	" " "
Claiborne-Grainger	*Alex B. Shipley, M.D.	Tazewell	" " "
Bledsoe-Sequatchie	*H. M. Roberson, M.D.	Pikeville	" " "
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Volume 26 February, 1936 Number 2

CONTENTS

Continued on page vi

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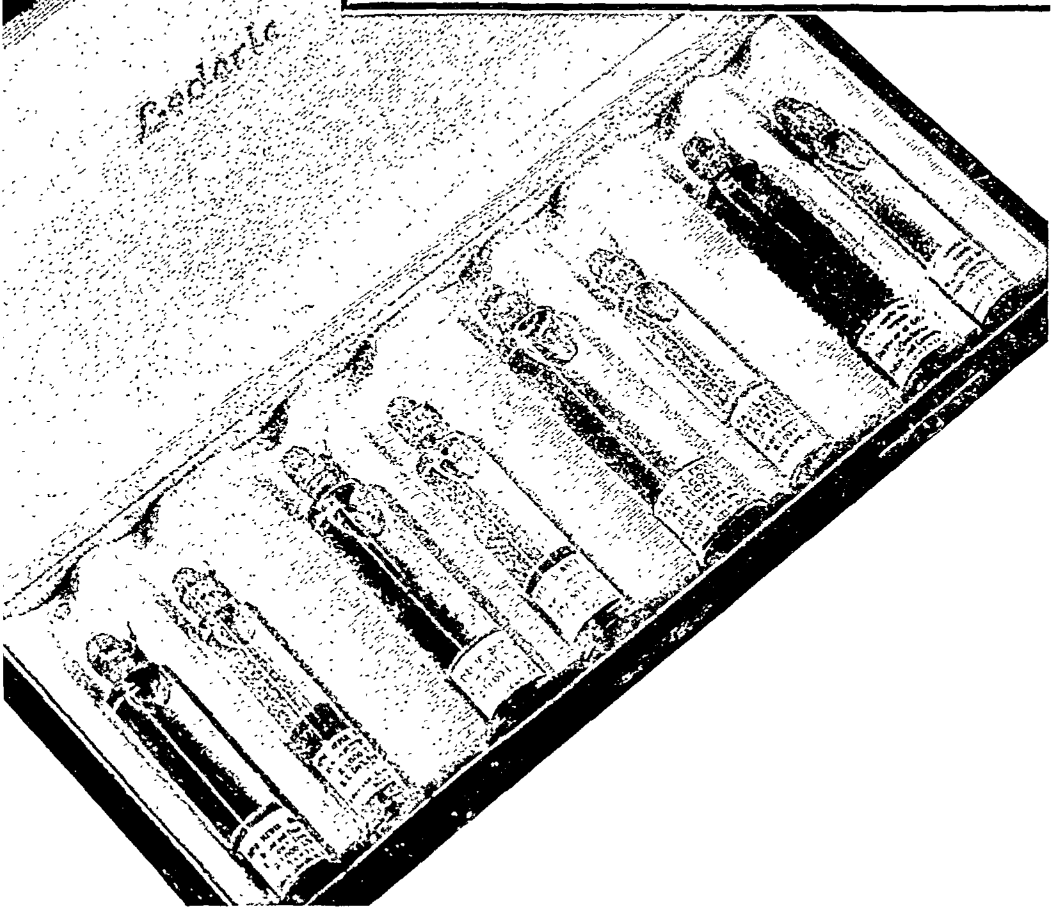

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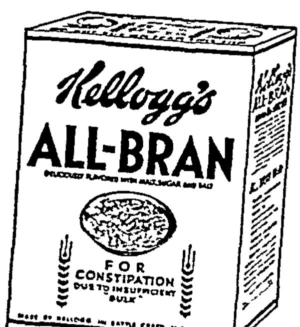
(3) *Wheat Bran as a Source of Vitamin B*, pages 368-374, *J. Am. Dietetic Assn.*, March, 1932.

(4) *Factors in Food Influencing Hemoglobin Regeneration*, pages 593-608, *J. Biological Chem.*, June, 1932.

(5) *Further Studies on the Use of Wheat Bran as a Laxative*, pages 795-802, *J. Am. Med. Assn.*, Mar. 18, 1933.



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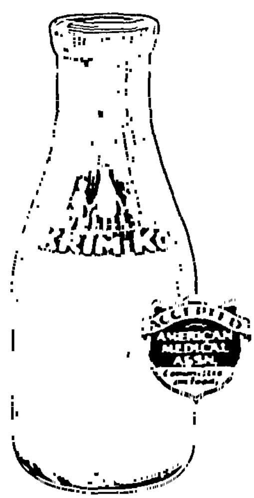

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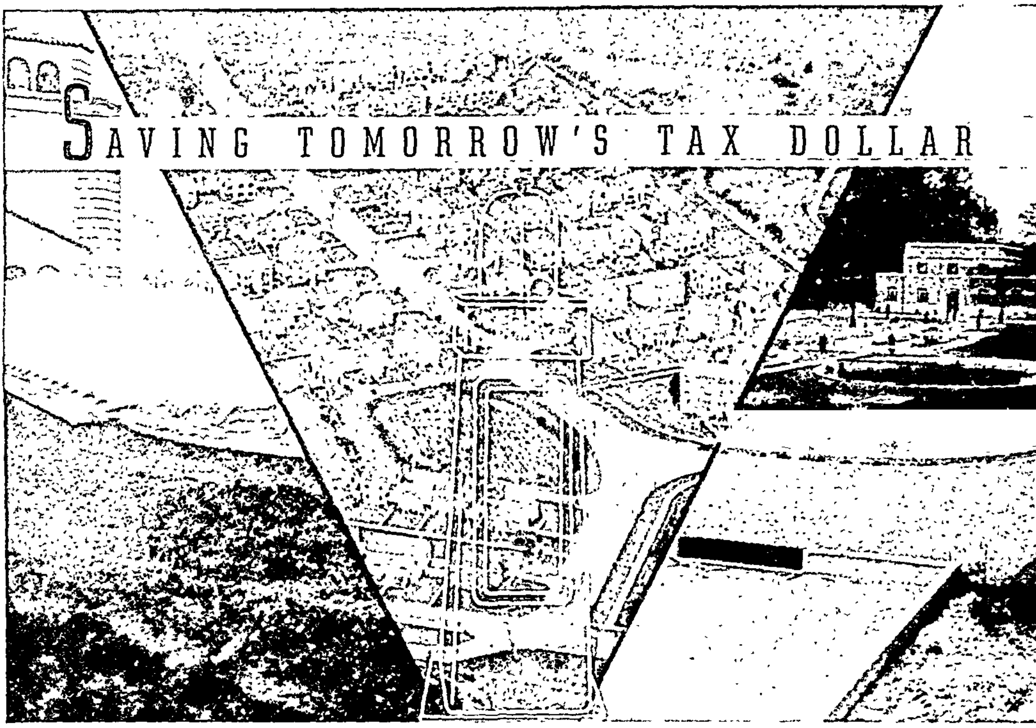

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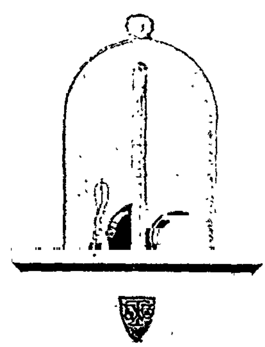

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American Journal of Public Health
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Volume 26 February, 1936 Number 2

Poliomyelitis in North Carolina in 1935*

CARL V. REYNOLDS, M.D., AND J. C. KNOX, M.D.
State Health Officer; and Director, Division of Epidemiology, State Board of Health, Raleigh, N. C.

NORTH Carolina has had much publicity this year because of its poliomyelitis epidemic. Inasmuch as this epidemic was one of the few ever described in a latitude so far south, it was not only of newspaper interest but also of scientific interest.

North Carolina is about 650 miles in length from its coastal boundary to its western mountainous boundary. The epidemic of poliomyelitis was confined largely to the east central section about 200 miles from the coast and 300 from the mountains. Considering the length of the state, our coastal and mountainous sections were as far removed from the center of the epidemic as though it had occurred at some distant point, *e.g.*, Washington, D. C., or possibly Savannah, Ga.

In studying our outbreak of poliomyelitis it may be interesting to observe that North Carolina lies in about the same latitude as southern California, approximately 36° north. The longitude is between 75° and 90° west. We have, from May through October, a mean temperature of 60.06°, and a mean rainfall of 27.57 inches. From November through April we have a mean temperature of 47.45° and a mean rainfall of 21.90 in. Eastern North Carolina has a mean temperature of 62.1° and a mean rainfall of 4 in.; central North Carolina a mean temperature of 60.2° and a mean rainfall of 3.99 in.; western North Carolina a mean temperature of 54.5° and a mean rainfall of 4.46 in. The only other recorded epidemic of poliomyelitis in this latitude comparable in extent to that in North Carolina this summer occurred in Southern California in 1934.

The average number of cases of poliomyelitis for the past 5 years has been approximately 73 cases per year. Our peak year, prior to 1935, was 1929 in which we had 133 cases reported. From January through October, 1935, 641 cases had been reported to the State Board of Health, with 59 deaths. The attack rate per 100,000 for the epidemic was 19.62; the death rate approximately 9 per cent.

In the preëpidemic period, January

* Read at the Fourth Annual Meeting of the Southern Branch, American Public Health Association, in St. Louis, Mo., November 19, 1935.

through May 15 this year, 39 cases and 11 deaths were reported. The epidemic appeared in the last half of May, with 59 cases reported for 2 weeks; 232 cases were recorded as having their onset in June; 204 in July; 56 in August; and 36 in September. The peak of the epidemic, by onset, occurred in June. Reviewing the records of poliomyelitis in North Carolina for the past 10 years, we find that the highest incidence occurred in August, with an average of about 18 cases.

Analysis of cases for 1935 reported as having onset January–September (622 cases) shows 8 per cent were under 1 year of age, 43 per cent were 1 to 4 years, 27 per cent 5 to 9, 9 per cent 10 to 14, 5 per cent 15 to 19, 2 per cent 20 to 24, 2 per cent 25 to 34, and 3 per cent 35 years and over (unknown age: under 1 per cent). The age distribution is noticeably greater in the 5–9 year group than in the past 5 years.

Of 622 cases, 338, or 54 per cent, were males; 284, or 46 per cent, females; 480, or 77 per cent, were white; 124, or 20 per cent, Negroes; 14, or 2 per cent, Indians; 4 race unknown.

Sixty-five per cent were rural and 35 per cent urban. The term "rural" applies to towns of less than 2,500. The attack rate per 100,000 among whites was 21.48; among Negroes, 13.50; among Indians 84. The population of North Carolina is 70 per cent white, 29½ per cent Negroes, ½ of 1 per cent Indian.

Among the 641 cases reported January–October there were 12 in which 2 occurred in the same family. Three had onset the same day as the original case; 2, 1 day later; 3, 2 days later; 1, 4 days later; 1, 6 days later; 1, 8 days later; and 1, 13 days later.

From the 181 case investigations the following information was obtained: 142 had spinal type of paralysis with 1 death; 14 had bulbar type of paralysis with 9 deaths; 6 had mixed types (bulbar-spinal) paralysis with 2 deaths; and 19 were non-paralytic.

Of the 100 counties, 80 reported poliomyelitis. Johnston, in the east central section, had the highest attack rate: 85.03 per 100,000; 52 had an attack rate of 10 or higher per 100,000. The mean average attack rate for the entire state for 14 years has been 1.9 per 100,000. Wake County (in which Raleigh is situated), adjoining Johnston, reported the highest number of cases, 55. Durham County, adjoining, 51 cases; Johnston, 49 cases. If there was any radial spread from Raleigh (which we may consider as having been the center of our epidemic), it was in a northerly and northwesterly direction. The counties just north of Wake border on Virginia.

The control policies adopted by the North Carolina State Board of Health during this epidemic are summarized as follows:

1. Immediately upon the appearance of an abnormal incidence of this disease, county and city health officers in North Carolina were informed by letter of the control policies of the State Board of Health.

2. Attendance at public gatherings, irrespective of nature, was strongly discouraged, especially for children.

3. Summer camps were advised not to admit patrons from affected areas.

4. Summer camps were advised not to permit unrestricted visiting by their patrons.

5. The Board of Health, by press, radio, and correspondence, warned against treatment by "quacks" and the use of untried medical "cures."

6. The Board of Health advocated the use of prophylactic vaccines *only* in controlled studies.

7. The Board furnished to each physician reporting one or more cases of poliomyelitis a copy of "Practical Suggestions on Poliomyelitis," a digest prepared by a Special Committee on Poliomyelitis for use in connection with the Poliomyelitis Scientific Exhibit at the Milwaukee Session, 1933, of the American Medical Association. It was hoped that this pamphlet would be helpful

to those physicians who were seeing poliomyelitis in their practice for the first time or after an interval of many years. It was felt that this was a service that the board could distinctly render, and the comment received from various physicians of the state was favorable.

8. The board also furnished to physicians, for each case reported, a questionnaire form to be filled in and returned. To date 181 of these have been returned and are analyzed elsewhere in this paper.

9. The board rendered consultant diagnostic service to any physician requesting it.

10. The board advised that all suspicious cases of poliomyelitis be treated as poliomyelitis until definite diagnosis was made.

Since the State Board of Health is state-supported, it was felt that any information on this epidemic collected by the board was public property and, therefore, factual information was made available at all times.

The poliomyelitis vaccines manufactured by Kolmer and Brodie were used in North Carolina during the epidemic. The Brodie vaccine was used in control studies; the Kolmer vaccine was used by private physicians.

CONCLUSIONS

During the epidemic observation led the board to conclude that:

1. A daily bulletin, in which facts are given, inspires confidence, secures coöperation, and dispels fear.

2. Early diagnosis and specialized care are the best means of preventing permanent paralysis.

3. The best means of prevention is in avoiding contacts.

4. So far, nothing has been learned from the vaccination of the 300 children in the City of Greensboro, with the Park-Brodie poliomyelitis vaccine. No cases of poliomyelitis have developed in either the control or the vaccinated groups.

5. This is also true of the Kolmer poliomyelitis vaccine, no complete records being available. Of this vaccine 3,327 c.c. was distributed by Dr. Kolmer to North Carolina physicians; the number of persons inoculated is not known.

6. In the experiment with the Park-Brodie vaccine, local abscesses occurred in 6 per cent of cases; 12 per cent developed nodules at the site of intradermal inoculation; 12 per cent developed medium size indurations.

7. A check of the field experiment, by laboratory immunity tests on both the vaccinated and the unvaccinated children, would be of considerable value in determining the efficacy of the vaccine. This check is already being made.

8. One in 4,600 developed the disease. Assuming that the vaccine is 100 per cent effective, is it a wise public health procedure to use it when the attack rate is so low?

9. Assuming that the vaccine is effective, would not the reactions, abscesses, nodules, indurations prevent its general use?

10. Assuming that the vaccine is effective, would not the incidence of the disease decry its general use?

11. Assuming, again, that the vaccine is effective, would not the potential danger of its producing paralysis decry its use?

12. If public health officials were to advocate a vaccine whose value had not been demonstrated, it would reflect itself in the loss of public confidence in those vaccines whose value is definitely known.

We must know the past to appreciate the present and prepare for the future.

Poliomyelitis in Virginia During 1935*

I. C. RIGGIN, M.D., F.A.P.H.A.
State Health Commissioner, Richmond, Va.

PREVIOUS to this year there have been 2 periods in which there was an unusual prevalence of poliomyelitis in Virginia—in 1916 and 1917 when the cases were distributed throughout the state, and in 1929, when cases occurred particularly in the southwest section. There are on record 345 cases in 1916; 318 in 1917; and 325 in 1929.

Records of the State Department of Health show that poliomyelitis was first reported in Virginia in July, 1910, and in that year there were 679 cases, a number greater than in any succeeding year until the present. Up to November 1, 1935, 674 cases and 37 deaths from poliomyelitis have been reported to the State Department of Health. The June cases showed the usual symptoms of poliomyelitis including paralysis or definite muscular weakness, and the expected age distribution of between 70 and 80 per cent of the cases under 10 years of age. Most of these cases were reported from the southern counties bordering on North Carolina where the disease appeared to be unusually prevalent. From the southern counties the disease spread, apparently along the routes of travel, into several sections of the state, though it reached epidemic proportions in only a few counties. As can be seen in Figure I, a peak was reached in the week ending July 20. After a slight recession lasting about 1 week, a wave of cases showing no paralysis or muscular weakness, classified as non-paralytic, first appeared in Richmond. Later, cases developed in Albemarle County, Roanoke County, and other sections.

Coincident with the change in the type of cases reported is the change in age distribution. Up to August 1, 67.7 per cent of the patients were under 10 years of age; by August 14 the percentage under 10 had dropped to 62.2 and by September 1 to 59.7 per cent.

This change in the clinical type of cases reported and their age distribution is brought out more clearly in Figure II. To date, 525, or approximately 80 per cent of the questionnaires sent to physicians reporting cases of poliomyelitis, have been received and analyzed. The cases have been divided into 2 groups: those showing paralysis or any muscular weakness, however slight or transitory (271), and those having no paralysis or weakness (254). The solid line shows the paralyzed and the dotted line the non-paralyzed group, plotted by date of onset.

The cases in the paralyzed group are best described as typical poliomyelitis, having the usual symptoms including more or less extensive paralysis or muscular weakness—67.5 per cent of the cases in this group were under 10

* Read at the Fourth Annual Meeting of the Southern Branch, American Public Health Association, in St. Louis, Mo., November 19. 1935.

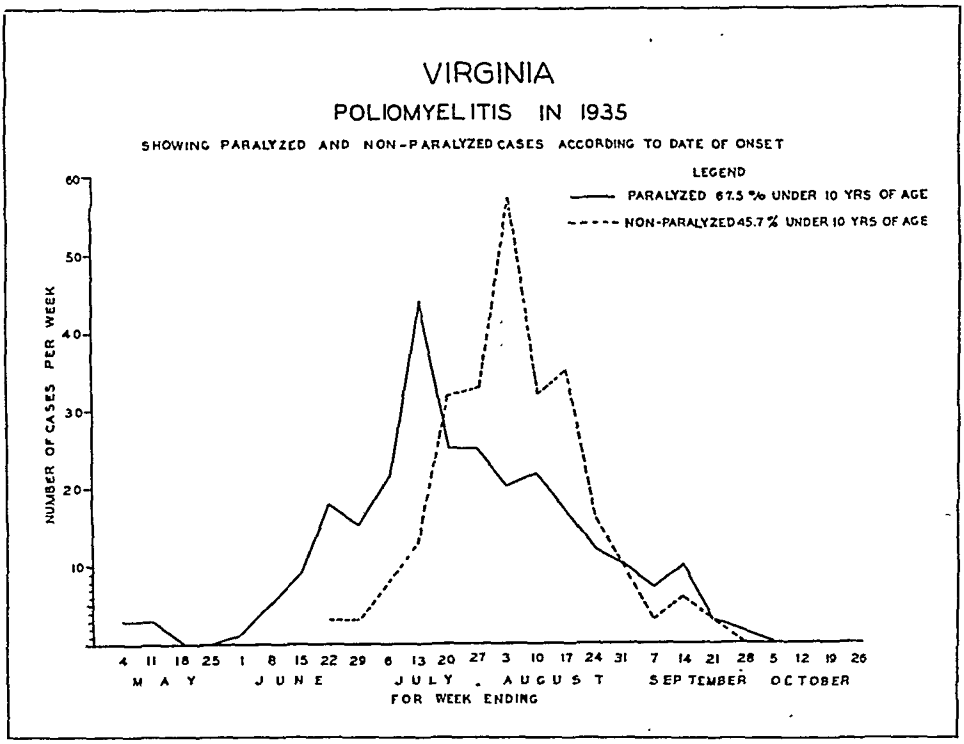

FIGURE I

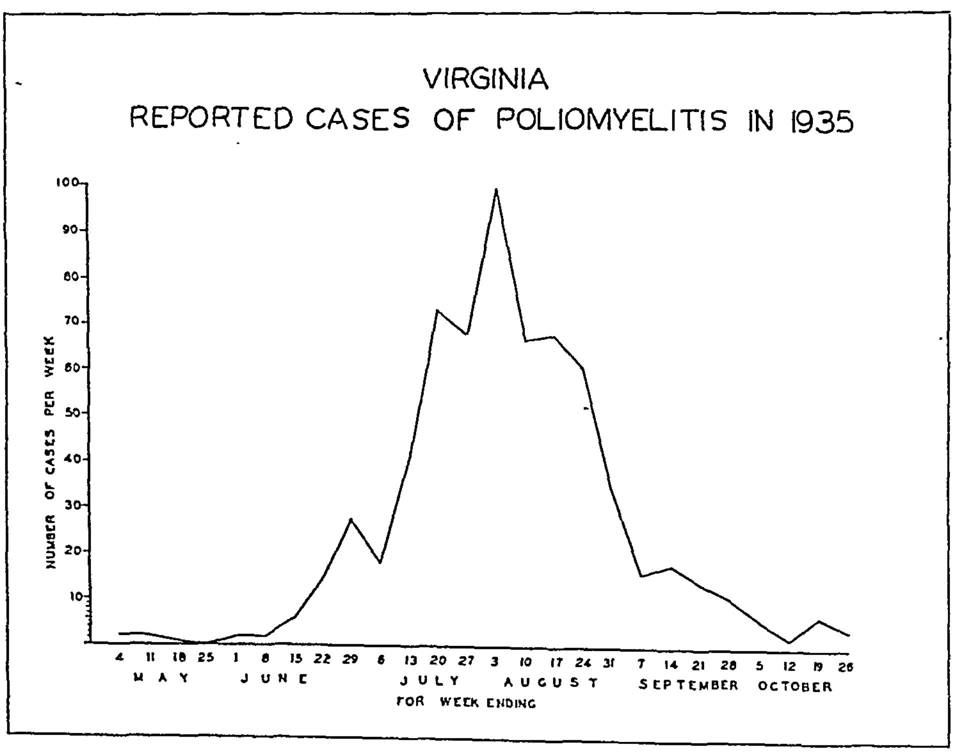

FIGURE II

years of age. The peak of the cases with paralysis was reached July 13, since which time the decline has been almost steady.

The cases showing no paralysis or muscular weakness are characterized by nausea and vomiting, a slightly stiff neck or back, and headache so severe in many cases that morphine was used. These symptoms lasted only 2 or 3 days in the majority of cases, and there was no paralysis or weakness. Moreover, a much higher percentage of the cases were in older people, for only 45.7 per cent of the non-paralytic cases were in children under 10. The first non-paralytic case did not occur until June 22 and the peak was not reached until the week of August 3, 2 weeks after the peak of the paralytic cases. When these two curves are added together, the double peaked curve shown in Figure I is produced and the increasing age of the reported cases is explained.

To summarize, in 1935 up to November 1, 674 cases of poliomyelitis, including 37 deaths, were reported to the State Department of Health. The disease reached almost every section of the state though it was unusually prevalent in only a few counties. It is remarkable how readily these cases, occurring mostly in a little over 2 months, separate into two distinct groups having marked differences. The paralytic cases, appearing first in the counties bordering on North Carolina and spreading along the routes of travel throughout the state, had symptoms typical of poliomyelitis, and the usual age distribution. A second wave, of non-paralytic cases, characterized by short duration of symptoms, and no paralysis, reached its peak 2 weeks later. A great many of these cases occurred in older people. The significance of these facts is as yet undetermined.

Federal Funds for Maternal and Child Welfare

IN each state the responsible official through whom the federal funds for general health work and maternal and child health work will be administered is the state health officer. He is faced with a great responsibility and will undoubtedly need the coöperation of all thinking citizens within his jurisdiction. It is obvious that, if the maximum sums authorized are appropriated and if matching appropriations are provided by state legislatures, state health departments will suddenly be possessed of larger sums than they have ever previously had to administer. Sudden expansion is always fraught with great danger. There is no time to experiment on a small scale, to test, to weigh, to modify, to adapt or perhaps to reject plans. Among the gravest problems will be that of qualified personnel. There is a great dearth of adequately trained health administrators, sanitarians, engineers, technicians, and public health nurses. The training provisions which will be found in the act will take time to put into effect.—W. W. Bauer, *A.M.A. Bull.*, Dec., 1935.

Anterior Poliomyelitis in Kentucky During 1935*

A. T. McCORMACK, M.D., F.A.P.H.A., (*Life Member*)
AND FRED W. CAUDILL, M.D.
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POLIOMYELITIS in Kentucky has shown a fairly definite periodicity between 1911 and 1935, the increases in incidence recurring at approximately 7 to 8 year intervals. The expectancy during interepidemic years averages from 20 to 40 cases annually. The last epidemic year previous to 1935 was 1927, when 192 cases were reported.

The 1935 epidemic really began in 1934, when 118 cases of poliomyelitis were reported. This was a very marked rise in prevalence compared with the years between 1927 and 1934, during which the annual average was 37 cases. Approximately 90 per cent of the cases reported in 1934 occurred during the summer and early fall. The disease abated during November and December, 1934, and only 8 cases were reported in the state from January 1 to July 1, 1935. During July the incidence showed a sudden and marked rise, 43 cases being reported. Of these, 23 occurred in 2 adjacent counties in the southwestern part of the state, Warren County reporting 12 cases and Edmonson County 11 cases. During that month the disease showed a gradual increase in prevalence also in Louisville and Jefferson County, 9 cases being reported from the City of Louisville. Hence, Warren, Edmonson, and Jefferson Counties constituted the 3 chief foci of prevalence of poliomyelitis in Kentucky in July. The remaining 11 cases reported during that month were in widely scattered sections of the state.

During August, 114 cases were reported, 61 of which occurred in Louisville and Jefferson County, the remaining 53 reported cases being fairly uniformly distributed among 12 counties lying southwest of Louisville, in what is known as the Mississippi Plateau, with an occasional case in the eastern and far western parts of the state.

In September, reports of 97 cases came in, 39 of which were in Louisville and Jefferson County. The other 62 cases were distributed among the 12 counties which lie southwest of Louisville.

During October, Louisville and Jefferson County showed a marked decrease in prevalence, but were still reporting more cases than any other single locality in the involved area. The situation in the rest of the infected part of the state was also showing definite and distinct improvement. Cases reported in October aggregated 46, of which 14 were in Louisville and Jefferson County, the remaining 32 distributed throughout the rest of the infected section of the state. The number of cases reported during the first week of November indicates that prev-

* Read at the Fourth Annual Meeting of the Southern Branch, American Public Health Association, in St. Louis, Mo., November 19, 1935.

alence of the disease is now back to what may be considered normal.

SUMMARY

A total of 308 cases of infantile paralysis in Kentucky was reported from January 1 to November 1, 1935. The months of greatest prevalence were July, August, September, and October. The section of the state showing the highest incidence comprises Louisville and Jefferson County and an area southwest of Louisville, known as the Mississippi Plateau and embracing Bullitt, Nelson, Hart, Barren, Edmonson, Grayson, Breckinridge, Warren, Logan, Muhlenberg, Hopkins, and Daviess Counties. This section includes about one-fourth of Kentucky's area.

Reported deaths due to poliomyelitis numbered 25, giving a specific fatality rate of 8.3 per cent. Approximately 67 per cent of those recovering from attacks of the disease showed some degree of paralysis, which ranged from a slight weakness in a single muscle group to a profound paralysis of one or more extremities. Fifty-seven per cent of the cases occurred in males; 43 per cent in females. Ninety-one per cent were in white children; 9 per cent in colored children. Cases and deaths in the various age groups are shown in Table I.

TABLE I

Age Group	*Cases*	*Deaths*
0– 4	137	17
5– 9	86	4
10–14	50	2
15–19	21	2
20 up	14	0
Total	308	25

It will be noted that the age group in which most cases occurred was that under 5 years. Seventeen of the 25 deaths were in children in this group.

New York Poliomyelitis Report Issued

A PRELIMINARY report on the poliomyelitis epidemic of 1935 has been published by the New York City Department of Health. About 1,900 cases had been registered up to the time of this report in October, which compares with 4,100 in 1931 and 9,000 in 1916.

The report points out the shifting of the incidence to the higher ages. In 1907, 86.6 per cent of the cases were in children under 5 years of age. In 1935, 32.8 per cent occurred in this age group. The case fatality also varied in these four epidemics. In 1907 the case fatality rate was estimated at 5 per cent; in 1916 it was 27 per cent, in 1931, 12.18 per cent, and in 1935, 4 per cent.

Of particular interest to administrative health officers will be the fact that, after due consideration, it was decided to open the city schools at the regular time. The department believes that this policy was sound because of the fact that no increase in prevalence followed the opening of the schools.

Poliomyelitis in Tennessee*

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THE poliomyelitis problem in Tennessee for 1935 hardly justifies a report at this time since the actual number of cases was only slightly in excess of the average incidence experienced through recent years. Fortunately for the public, the greatest prevalence was noted in the newspapers and practically every case occurring was commented on in more than one paper.

The disease reached epidemic proportions in only 2 areas of the state. The greatest problem was found in the 4 counties of East Tennessee located in the extreme northeastern section of the state immediately adjacent to North Carolina and Virginia. The second area was in the northwest portion of Middle Tennessee, adjacent to the Kentucky line.

For the first 10 months of 1935, 78 cases with 15 deaths have been reported. For the corresponding period of 1934, there were 59 cases and 27 deaths. The case fatality rates were 19.2 and 45.4 for the years 1935 and 1934, respectively. While we have no evidence to support the statement, it is quite likely that the majority of cases reported were those showing paralysis; hence, the actual number of cases known is much smaller than it is reasonable to assume occurred. The distribution of cases was more or less normal, and while the number of cases is rather small, it is interesting to note that 62 per cent of those reported were in children under 10 years of age, with 72 per cent residing in rural areas. The case incidence, based on proportionate population, in the white was about twice that in the colored. The epidemic, if we may call it that, reached its highest incidence on or about August 1.

The following control measures were advocated:

1. Encouragement of prompt reporting by physicians and others of all positive or suspected cases with rigid quarantine of all cases and contacts. While the control procedure may or may not have been of any particular aid in controlling the epidemic, nevertheless, for policy's sake, it was deemed advisable to do something.

2. Newspaper articles in the form of general preventive measures released from time to time. An effort was made to give facts and at the same time avoid arousing public hysteria.

3. In two of the eastern areas, which incidentally were quite closely connected with the North Carolina and Virginia areas, being on the main transportation routes, the local boards of health instituted control measures for the younger age group—all children under 15 years of age were required to remain away from school, public gatherings, and downtown areas for a period of 2 weeks. While this may not have had any effect, it is interesting to observe that the disease apparently subsided with the institution of these measures.

4. Diagnostic consultant service available through the State Health Department to all part- and full-time county health officers upon request. There was no state-wide program for rendering assistance in the treatment of reported cases.

5. Immunizing agents in the form of vaccine (Park-Brodie, and Kolmer products) were neither recommended nor used as a routine control measure.

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* Read at the Fourth Annual Meeting of the Southern Branch, American Public Health Association, in St. Louis, Mo., November 19, 1935.

Poliomyelitis in Charlottesville, Virginia, and the Adjacent County of Albemarle*

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WITHIN the past few months poliomyelitis has been reported throughout the State of Virginia to an extent never before recorded. Not since the influenza epidemic of 1918 and 1919 has the populace of this state been so acutely concerned with its state of health, and undoubtedly there has been sufficient cause for this very manifest anxiety. It must be admitted that in certain sections of Virginia poliomyelitis has occurred in serious epidemic proportions. Charlottesville and Albemarle County have been publicly referred to as a "hot-bed" of poliomyelitis; and if one cares to base an opinion on figures made public, this would certainly seem to be a proper characterization.

In the clinics at the University of Virginia Hospital we have observed 111 patients who, in our opinion, were suffering from poliomyelitis and were so certified to the proper authorities. In every case the diagnosis was confirmed or strongly suggested by examination of the cerebrospinal fluid. The purpose of this paper is to describe clinically these cases as we have observed them, and to discuss briefly certain very pertinent facts of medical interest and importance. In view of the difference of opinion and conflict of emotions resulting from our recent experience, a discussion of this subject would seem particularly desirable at this time.

When poliomyelitis first appeared in Charlottesville and surrounding sections, it became necessary for the University Hospital to adopt a policy concerning the admission of cases of this disease. Due to physical conditions which made impossible adequate isolation of patients, hospital authorities made it a rule to accept no patient who could be adequately cared for in the home. The majority of the patients described in this report were, therefore, seen in the out-patient clinics. Thirty-eight were observed by those in charge of the adult service, and 73 by those in charge of the pediatric service. Since it was necessary to return these patients to their homes, in many instances only one examination was afforded during the acute stage of the disease. In evaluating this series, particularly as regards the frequency of any one sign or symptom, it must be remembered that the majority represent out-patient cases, most of them seen only once. Nineteen patients were treated in the hospital, and afforded a better opportunity for study. Forty-seven of the patients from the department of pediatrics were subsequently

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brought back for a follow-up examination after the period of quarantine had expired.

As with previously reported epidemics the disease has been observed chiefly in children and young adults. The youngest case was 8 weeks of age and the oldest was 35 years. Table I shows the incidence in the various age groups.

TABLE I

AGE GROUPS

Youngest 8 weeks		7 to 8 years	6
Under 6 mos.	5	8 to 9 years	7
6 mos. to 1 yr.	3	9 to 10 years	3
1 to 2 years	6	10 to 11 years	5
2 to 3 years	13	11 to 12 years	3
3 to 4 years	3	12 to 15 years	12
4 to 5 years	6	16 to 20 years	9
5 to 6 years	8	21 to 25 years	12
6 to 7 years	5	26 to 30 years	4
31 to 35 years	1		

Under 12 Years	73 Cases
Over 12 Years	38 Cases

The onset has been sudden and characterized in most instances by fever, headache, vomiting, and stiffness of the neck and back, this stiffness being associated with pain in many instances. This group of symptoms has been so constantly present that the history of one might well serve for the majority. This has been especially true as regards the older children and adults.

Fever was present at the time of examination in 60 cases. While the recorded temperature of our patients varied from normal to 105° F., it must be remembered that the degree of temperature naturally varied in relation to the time of onset. The average temperature at the time of examination ranged from 101° F. to 102° F.

Headache was the most common finding, occurring in 83 of the 111 cases. The headache was usually frontal and was made worse when the patient attempted to sit up. The incidence of headache was very striking, even in the younger children, and it must be admitted that headache is not a common childhood complaint.

As in previous epidemics the most pathognomonic of all signs was stiffness of the neck and spine. Efforts to induce flexion of the spine caused marked "splinting" in a fair proportion of our cases, and evidence of stiffness of the neck and back was noted in 37.9 per cent. A typical "poker spine" was observed more frequently in older children and adult patients.

Nausea or vomiting occurred 69 times as an early sign, and diarrhea 10 times. In some instances vomiting was a very troublesome feature, and interfered with symptomatic treatment.

Sore throat was a complaint in 5 instances, and many patients not complaining of soreness showed on inspection marked injection of the tonsils and posterior pharyngeal wall. Coryza was noted in only 2 instances.

Hyperesthesia was noted less frequently perhaps than in previous epidemics. Pain in the extremities was present in 10 patients; 20 complained of abdominal pain; and 1 was sent to the hospital by the attending physician with a diagnosis of acute appendicitis. A not infrequent sign was pain and soreness when the eyes were rotated and occasionally these patients objected to bright light.

Listlessness or actual drowsiness was observed 17 times. Convulsions were noted in 2 patients, the older being 5 years of age and the younger 2 years.

Change in the reflexes was common. Exaggerated reflexes early in the disease was the rule; examination later often showed marked diminution or actual loss of deep reflexes previously hyperactive. We agree with other observers that reflexes in infants and very young children are apt to be uncertain and unreliable. It may be stated with a reasonable degree of accuracy that reflex changes were present in 47.8 per cent of our cases.

TABLE II

SYMPTOMS AND SIGNS

	Cases	Per Cent		Cases	Per Cent
Headache	83	74.7	Pain in extremities	10	9.0
Vomiting	62	55.9	Nausea	7	6.3
Temperature on examination	60	54.0	Sore throat	5	4.5
Change in reflexes	53	47.8	Difficulty in breathing	3	2.7
Pain and stiffness of neck or back	42	37.9	Dizziness	2	1.8
Evidence of muscle weakness	24	21.6	Coryza	2	1.8
Pain in abdomen	20	18.0	Convulsions	2	1.8
Listlessness or drowsiness	17	15.3	Unable to void	2	1.8
Diarrhea	10	9.0	Enlargement of spleen	2	1.8
			Unable to swallow	1	0.9

Respiratory difficulty was observed in 3 patients and in 1 this made necessary the use of the respirator over a long period of time.

Retention of urine was noted in 2 instances, being sufficiently obstinate to require the use of a catheter. In both patients this condition was completely relieved in a few days.

Enlargement of the spleen was a confusing finding in 2 patients, and typhoid fever with meningismus had to be ruled out as a probable diagnosis. The usual laboratory procedures diagnostic of this disease were negative. The subsequent course of the disease substantiated the diagnosis of poliomyelitis.

Table II shows the frequency of the various symptoms and signs observed.

A most interesting feature has been the infrequency of paralysis compared with the number of individuals affected. Twenty-four of our 111 cases showed definite muscle weakness or actual paralysis. It must be remembered that the majority of the patients were seen only once, and that transient muscle weakness may have occurred and probably did occur subsequent to our examinations. It is by no means easy to measure muscle weakness in certain groups of muscles and we admit that our ability to detect this sign improved very noticeably with further acquaintance with the disease. This was particularly true with infants and young children. It seems likely that physicians for many months to come will see patients with weakness in certain muscle groups as well as changes in posture and other evidence of diagnosed and undiagnosed poliomyelitis. We were able to detect muscle weakness in 21.6 per cent of the patients, and a considerable number showed weakness or actual paralysis after being discharged from quarantine.

The various regions of the body showing muscle weakness or actual paralysis are indicated in Table III.

TABLE III

TYPES OF PARALYSIS

Paralysis of one or both legs	10
Paralysis of one or both arms	5
Combined paralysis of legs and arms	5
Isolated paralysis of cranial nerve	2
Combined paralysis of spinal and cranial nerves	3

Total—24 patients or 21.6%

The average duration of acute symptoms was 3 to 5 days. In 25 cases in which this fact could be accurately determined the average was 4.4 days. An illness of 36 to 48 hours was frequent.

SPINAL FLUID

One or more spinal fluid examinations were made in each case. All laboratory tests were done under the

direction of Dr. William E. Bray, Professor of Clinical Diagnosis, at the University of Virginia, and we acknowledge our appreciation of his helpful advice and coöperation.

In every instance the spinal fluid was noted as clear or, at most, slightly opalescent. The pressure appeared normal or perhaps slightly increased in a few instances.

Increase in cells while present in most cases, has been a variable factor. It is generally accepted that the earliest pathological change in the nervous system is hyperemia. It is not surprising that marked differences in the cell count have been observed in this series of cases as in all others reported. The degree of cell increase was in no way proportionate to the severity of symptoms or the occurrence of paralysis. A cell count above 12 has been considered an abnormal finding. In this series we found 39 cases with a cell count less than 12 but in every one there was a noticeable increase in spinal fluid protein. What one finds in the way of cell increase may vary with the time at which lumbar puncture is performed. We found 39 cases in which lumbar puncture, performed within 24 to 36 hours of the acute illness, showed only increase in the protein content of the spinal fluid. Punctures performed several days later on 8 of these patients showed the characteristic cell increase in 3. Our observation of the cell count has ranged as follows: 39 cases with a count below 12; 26 between 20 and 60; 13 between 60 and 100; 12 between 100 and 200; 15 above 200. Twenty cases at the time of first lumbar puncture had no cells, and the highest had 1,480 cells. The average for all cases showing definite cell increase was 155.4 cells. In 41 cases the type of cell was of the lymphocyte variety, while in 47 polymorphonuclear cells predominated. In 3 instances the cell types were equally divided. Polymorphonuclear increase was frequent in those cases showing marked cell increase.

We have been interested in protein increase as a sign of central nervous system involvement, and have reported as poliomyelitis 39 cases in which protein increase was the only spinal fluid finding indicative of the disease, 6 of which showed typical cell increase later. Our reasons for reporting such cases seem to us sufficient. Very early in our experience we observed a case with marked paralysis of the face and arm in which protein increase was noted without increase in cell count. We note that Levinson [2] has recently reported 5 cases with muscle weakness in which there was no increase in cells, to which 5 cases we are glad to add 11 more. It is, of course, to be supposed that we have certified no case

TABLE IV

SPINAL FLUID ANALYSIS

Number of Cells	Number of Cases	Cell Type			Globulin				
		Pmn	Lymph	Equal	Normal	1+	2+	3+	4+
None	20	0	0	0	..	8	8	3	1
Below 12	19	4	14	1	1	8	8	2	0
12– 20	6	3	3	0	..	3	2	1	0
20– 60	26	12	13	1	1	14	11	0	0
60–100	13	7	6	..	2	3	6	1	1
100–200	12	9	3	..	..	4	2	3	3
200–400	7	4	2	1	..	2	1	2	2
400–600	6	6	0	..	..	2	1	2	1
Over 600	2	2	0	..	..	0	1	1	0

TABLE V

CASES SHOWING INCREASED PROTEIN AND CELL COUNT UNDER 12 CELLS

Days from Onset, 1st Puncture	*Cells*	*Glob.*	*Stage of Illness*	*Weakness*	*Days from Onset, 2nd Puncture*	*Cells*	*Glob.*	*Stage of Illness*	*Weakness*
4	0	1+	Acute	No	6	143	2+	Convalescing	No
1	0	1+	Acute	No	5	6	2+	Acute	No
1	0	1+	Acute	No	3	0	2+	Convalescing	No
2	12	1+	Acute	Left leg					
2	2	2+	Subacute	Both legs and arms					
1	6	2+	Acute	No					
3	0	2+	Acute	No					
4	0	2+	Acute	No					
7	0	3+	Acute	Right leg					
7 hours	0	2+	Acute	No					
3	0	2+	Subacute						
3	0	3+	Subacute	No					
2	0	0	Acute	No	8	42	1+	Subacute	Right leg
2	0	2+	Acute	No					
12 hours	0	1+	Subacute	No					
1	0	1+	Acute	No	3	0	2+	Convalescing	No
2	0	3+	Acute	Left leg					
7	0	2+	Acute	Right leg					
2	0	2+	Acute	No					
2	0	0	Acute	No	5	14	3+	Acute	No
1	0	1+	Acute	No					
3	0	1+	Acute	No					
7	0	4+	Acute	Right leg	15	0	3+	Subacute	Right leg
2	0	1+	Acute	No					
4	0	1+	Acute	Right leg					
2	12	0	Acute	No					
3	5	1+	Subacute	No					
1	11	2+	Acute	No					
7	3	1+	Subacute	Right facial and arm					
1	11	1+	Acute	No					
5	1	3+	Acute	No					
18 hours	10	1+	Acute	Both hands					
7	1	2+	Acute	No					
12 hours	10	1+	Acute	Both hands					
8	1	2+	Convalescing	No					
12 hours	7	3+	Acute	No					
1	5	1+	Acute	No					
2	1	2+	Acute	No					
12 hours	1	1+	Acute	Right leg					
12 hours	1	1+	Acute	No	3	10	2+	Subacute	Unable to void
2	10	2+	Acute	No					

CASES WITH 2 OR MORE LUMBAR PUNCTURES

Days from Onset, 1st Puncture	*Cells*	*Glob.*	*Stage of Illness*	*Weakness*	*Days from Onset, 2nd Puncture*	*Cells*	*Glob.*	*Stage of Illness*	*Weakness*
1	0	—	Acute	No	5	85	0	Acute	No
1	0	0	Acute	No	4	96	2+	Subacute	No
4	0	1+	Subacute	No	7	143	2+	Convalescing	No
1	0	1+	Acute	No	5	6	2+	Subacute	No
1	0	1+	Acute	No	3	0	2+	Acute	No
2	510	1+	Acute	No	4	115	1+	Subacute	No
12 hours	14	2+	Acute	No	5	360	4+	Convalescing	No
2	0	0	Acute	No	8	42	1+	Subacute	Right leg
1	0	1+	Acute	No	4	0	2+	Convalescing	No
3	24	2+	Acute	Bulbar throat	13	3	4+	Subacute	Bulbar
2	0	0	Acute	No	5	14	3+	Acute	No
12 hours	1	1+	Acute	No	2	10	2+	Acute	Unable to void
Several hours?	280	2+	Acute	No	6	3	2+	Convalescing	No
7	0	4+	Acute	Right leg	15	0	3+	Convalescing	Less extensive
1	1480	3+	Acute	No	2	347	4+	Acute	No

as poliomyelitis, with protein increase as the only spinal fluid finding, that was not supported by adequate symptoms and signs of the disease. It is felt that too little emphasis has been placed on the possible absence of cell increase in poliomyelitis. This feeling has been voiced by other writers.[3, 4, 5, 6] Meals and Bower,[5] have pointed out the error of current medical opinion on this point and have reported a series of cases in which 12.8 per cent had a normal cytology in the spinal fluid, yet showed characteristic neurological findings.

It is realized that protein increase and abnormal cytology have been observed in numerous types of illness. When poliomyelitis is occurring in epidemic proportions these same conditions are not infrequently erroneously classed as examples of this disease.

As a further check in the finding of increased protein in the spinal fluid, we have to date studied 25 patients not suspected of having poliomyelitis. On account of the ease of securing specimens we selected for this group surgical patients receiving spinal anesthesia. Sixteen showed negative spinal fluid findings. Of the 8 showing positive globulin, 1 was found to have a cord tumor; another had previously been diagnosed syphilis of the central nervous system, and showed cell increase as well as protein increase; a third gave a definite history of poliomyelitis within the week preceding the onset of appendicitis; 1 other case had positive serology of syphilis. In 4 instances we were unable to account for increased protein unless the following surgical conditions can be held accountable: acute appendicitis with migraine, carcinoma of the cecum, ruptured appendix, and inguinal hernia.

Spinal fluid sugar determinations were made in 69, and chloride determinations in 50 instances. In no case did these findings suggest some other disease. The average sugar content was 59 mg. per 100 c.c., and the average chloride content was 584 mg. per 100 c.c. of spinal fluid.

In Table V are listed a group of cases all of which had normal cytology in the spinal fluid at the time of the first puncture. It will be noted that in 15 lumbar puncture was done within 24 hours of the onset, and in 11 within 48 hours. The symptomatology differed in no way from other cases which we have observed. Protein increase was present in all but 3 at the time of first puncture.

MORTALITY

Death occurred in 3 patients, 2 as the result of bulbar paralysis, and 1 from pneumonia following a prolonged stay in a respirator. A complete necropsy was obtained in the case reported below.

Hospital No. 118764. H. K., negro male child, 2 years of age, was admitted to the University of Virginia Hospital because of nausea and restlessness of 3 days' duration. Twelve hours before admission the child seemed weak and unable to stand.

Physical examination showed an acutely ill child. Respiration was labored and breathing abdominal. Drowsiness almost to the point of stupor was noted. There was nystagmus of both eyes in the horizontal direction. The throat was injected and a generalized lymphadenopathy was present. There was marked weakness of both legs and arms, more noticeable on the left side. Rigidity of the neck was not present. Knee jerks and ankle jerks were absent and abdominal reflexes could not be elicited. Other reflexes appeared normal.

Temperature on admission was 104° F., respiratory rate was 84 per minute, pulse rate 198. The blood showed 100 per cent hemoglobin, 4,400,000 red and 21,400 white cells. Differential

showed 69 per cent polymorphonuclears and 25 per cent lymphocytes, and one eosinophil. Lumbar puncture showed 372 cells with polymorphonuclears predominating. Pandy's was negative and Ross Jones's 1 +.

Death occurred 4 hours after admission, apparently as a result of bulbar paralysis.

We are indebted to Dr. Albert E. Casey, Associate Professor of Pathology at the University of Virginia, for the following necropsy and pathological report.

NECROPSY AND PATHOLOGICAL REPORT

Cultures of tissues from the spinal cord and from the heart were made in bile and broth. These were found to be sterile.

The gross anatomical findings in this case represent first an enormous enlargement of all lymphoid tissues in the body, particularly noticeable in the Peyer's patches and solitary follicles of the intestines, mesenteric, mesocolic, and retroperitoneal lymph glands. The spleen was enlarged, friable, and the splenic corpuscles unusually prominent. A small reddish nodule was seen on the tunic of one testicle. Small bright red, circular areas, several mm. in diameter, were scattered over the lungs, and there was congestion of the lungs on section. The vessels of the meninges were markedly injected; no discoloration of the cerebrospinal fluid was noted. On cut section there was marked injection of the gray matter, particularly in the cervical spinal cord, in the medulla, areas of the pons, thalamus, lenticular caudate nuclei, but not prominent elsewhere.

The microscopic findings show an enormous enlargement of the germinal centers of lymph follicles throughout the body with diminished mitoses, increased masses of monocytes and endothelial cells and clasmatocytes, with occasional areas of focal necrosis. The peripheral mantel of small lymphocytes was much diminished and in many instances could with difficulty be found. This change involved the lymph follicles of the spleen (splenic corpuscles), of all lymph nodes, solitary follicles, and Peyer's patches. The reticulo-endothelial cells in the lymph sinuses were markedly increased in numbers and occasional neutrophils and eosinophils were seen. The interstices of the lungs were thickened with edema and considerable exudates of monocytes and neutrophils. The pulmonary alveoli were very little affected. The perivascular and lymphatic spaces throughout the body in all tissues showed scattered neutrophils, monocytes and eosinophils. In the meninges, particularly in the thoracic, cervical, and medullary areas, there were moderate numbers of monocytes and neutrophils, the former predominating. The perivascular spaces of the cord, medulla, thalamus, cerebellar nuclei, lenticular and caudate nuclei showed masses of neutrophils and monocytes, the change being possibly most marked in the pons and medulla, and diminishing distally from this area. There were a few small foci of monocytes and neutrophils in the gray matter of the cord or nuclei, not apparently related to the blood vessels. Scattered ganglion cells showed basophilic cytoplasm and hyperchromatic nuclei. Occasional dead cells were noted. In the cord, individual fibers and bundles of fibers show considerable swelling of the myelin. Anterior and posterior portions of the cord and brain were equally affected. The lateral cerebral hemispheres, ventricles, and choroid plexus were little affected. Occasional neutrophils and monocytes were present in the perineural lymph spaces of peripheral nerves. The liver showed a diffuse cytoplasmic fatty change, more prominent near the central veins. No areas of focal necrosis.

In conclusion, the change is that of a generalized infection marked by an exudate of reticulo-endothelial cells of monocytic and clasmatocytic types, of neutrophils and eosinophils. The lymphoid tissues, the interstices of the lungs, the lower cerebral and upper spinal segments being most affected.

RECOVERY OF VIRUS

The spinal cord was placed in glycerine and forwarded to Dr. Charles Armstrong at the National Institute of Health. He recovered a strain of virus capable of causing paralysis in monkeys. This, in so far as we are aware, represents the only instance of the recovery of a virus strain from a case of poliomyelitis in Virginia or North Carolina.

ESTIMATED INCIDENCE IN CHARLOTTESVILLE AND ALBEMARLE COUNTY

Charlottesville and Albemarle County have a population of 42,000. We estimate that 1,500 cases of poliomyelitis

have occurred in the city and county. It seems hardly possible that the University Hospital clinics could have received more than one-tenth of the total number of people affected. The mildness of the recent epidemic lends support to this assumption, and conversations with various physicians further convince us that our estimate is conservative. Numerous physicians admit having seen 50 or more cases presenting symptoms and signs identical with those we have described. The majority of these physicians, having profited by a first experience with poliomyelitis, as have the writers, feel that their patients represented true cases of this disease, although reports of only a few of their cases will be found in the records of our State Health Department. The reasons for failure to report need not be discussed at this time. If the disease here described is poliomyelitis, we must admit a morbidity out of all proportion to previous ideas as to its incidence.

A morbidity rate such as we have described is certainly not in accord with our previous conception of this disease. Figures concerning the morbidity rate of past epidemics of poliomyelitis are largely those of state and federal public health agencies. We are inclined to believe that they do not tell the whole story and that perhaps past epidemics have had associated with them a large number of non-paralytic cases which have never come to the attention of the medical profession. Due to the activities of a very energetic corps of field nurses we have had the opportunity of observing a large number of mild cases, so mild in many instances that they would ordinarily not have sought the services of a physician.

Just how misleading statistics on this subject may be is well illustrated by the following comparison: During the past spring and summer 647 cases of poliomyelitis were reported to the Virginia State Health Department, 191 of these from Charlottesville and Albemarle County. Questionnaires on these 647 cases were productive of 525 answers. Of these 525, 271 had suffered some degree of muscle weakness, and 254 were reported as non-paralyzed, a paralysis rate of 51 per cent. Among the answers received were 191 from Charlottesville and Albemarle County which reported 28 paralyzed and 163 non-paralyzed cases, a paralysis rate of 14 per cent, as compared to 51 per cent for the state at large. Excluding the cases from Charlottesville and Albemarle County, the paralysis rate for the remainder of the state is 72 per cent. If the disease described by us is poliomyelitis it must be admitted that our state statistics can hardly be of any real value in so far as any comparative study is concerned.

The discrepancy can in a large measure be explained by confusion in the medical ranks and the reporting of only paralyzed cases. The reporting of paralyzed cases alone gives no reliable index of the incidence of poliomyelitis in any city or state, and the quarantine of a few paralzed individuals accomplishes little in the way of public protection. Once poliomyelitis becomes entrenched in a community it is doubtful if any system of quarantine can be effective. It would seem to us necessary that we change many of our present ideas concerning quarantine of and the reporting of cases of poliomyelitis.

The very prevalence of the disease together with the low rate of paralysis have been the two features which have led many careful physicians to refuse to admit any unusual occurrence of poliomyelitis in this state, or to advance the idea that we have been dealing with a virus disease other than poliomyelitis, or that we have been dealing with poliomyelitis in addition

to some other disease occurring in epidemic proportions. It is well known that poliomyelitis is a protean disease and that past epidemics have differed one from the other in many particulars. All previously recorded epidemics have had in common certain symptoms and signs which make it seem proper to class them as examples of one and the same disease. The same can be said for the disease that we have described, and until there is adequate proof that we have been dealing with a new and previously unreported condition, we prefer to consider our cases as examples of poliomyelitis. We have seen recently a sufficient number of mild cases confirmed by spinal fluid findings to incline us very strongly to the view advanced by Paul and Trask [1] and others, that certain "characteristic types of minor illness which accompany an epidemic of poliomyelitis, probably represent mild cases of the disease."

It is to be regretted that some serious study attempting to prove or disprove an epidemic of poliomyelitis in this state has not been undertaken. If a new disease can be proved the writer will feel grateful for the opportunity of having observed and studied after a fashion a considerable number of patients so affected.

CONCLUSIONS

One hundred and eleven cases have been described which have had sufficient similarity to previously reported epidemics to stamp as poliomyelitis a recent outbreak of disease occurring in Charlottesville, Va., and adjacent territory. Laboratory data and clinical evidence are supplied which warrant the assertion that in epidemic times normal cytology is no proof that the case in question is not one of poliomyelitis. The finding of increased protein in the spinal fluid is of great diagnostic value and in this series, for practical purposes, has been a constant finding and a very material aid in the diagnosis of early cases.

We cannot consider poliomyelitis solely in terms of its neurological manifestations as is the current medical tendency. We think it proper to consider it as a systemic disease with neurological manifestations in the majority of instances. To think otherwise precludes the probability of diagnosis of early abortive and nonparalytic cases and interferes very materially with a proper conception of its probable incidence.

We are unable to suppose the presence of a new disease, as has been frequently suggested, and feel that this thought may well be the natural reaction of many physicians experiencing for the first time an epidemic of poliomyelitis in all its manifestations. The low death rate and the infrequent occurrence of muscle weakness and paralysis suggest the hope that poliomyelitis may be fast becoming a less malignant disease.

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Results of Field Studies With Poliomyelitis Vaccine*

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DURING the past year lay and medical interest in vaccination against poliomyelitis has been much aroused. With the advent of the 1935 poliomyelitis season it became evident that this interest would be translated into fairly widespread use of the proposed vaccines as prophylactics for the disease. It appeared to the Public Health Service that there was insufficient evidence to justify any general recommendation of them as prophylactics. On the other hand, the vaccine prepared by Dr. Brodie appeared on theoretical and experimental grounds to be reasonably safe, and seemed to offer some hope as a preventive. Realizing that its use would probably be rather extensive, it was felt worth while to observe its application in controlled studies designed to determine its efficacy in preventing poliomyelitis under field conditions. So far as we are aware no such rigidly controlled clinical study has been undertaken to evaluate this, or any other vaccine. It was fully appreciated that the chance of reaching a definite conclusion was slight, and was dependent upon the subsequent development of a sharp outbreak of the disease in the study area, but it was believed that such an attempt should nevertheless be made.

On May 30 one of us arrived in Raleigh, N. C., at the request of the State Health Department. After consultation with officials of the department it was decided to offer assistance in vaccine studies in communities not then involved in the beginning outbreak. For reasons of administrative convenience urban centers were desired as study points rather than rural areas.

It also seemed desirable to avoid communities in which there was already an unusual incidence of poliomyelitis, in order to reduce the risk of vaccinating individuals in the incubation period of the disease.

Because of particular interest shown in Greensboro by 2 practitioners and the health officer, Dr. C. C. Hudson, this city was selected as the first center for the trial. Greensboro was about 80 miles west of the heavily infected focus, but since the epidemic began early in the poliomyelitis season, it seemed reasonable to suppose that Greensboro would eventually be involved. Dr. Hudson arranged a meeting of the physicians there and the proposed study was thoroughly discussed.

It was desired to use the vaccine under conditions simulating those under which it would ordinarily be used except that the choice of individuals to receive it be uninfluenced by any

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factors which could conceivably affect the results, and the follow-up on the vaccinated and unvaccinated be coördinated. The patient-physician relationship was maintained.

Dr. Hudson and the local medical society prepared a statement (approved by one of us) offering the vaccine to the public in the following manner:

The vaccine was offered frankly for study purposes—to determine its efficacy in preventing poliomyelitis under field conditions. It was considered as offering hope as a prophylactic and as being reasonably safe. Parents desiring vaccine for their children under 8 years of age were instructed to list name, address, age, color, and sex with their own physician. The physicians' lists would then be turned over to one of us who would arbitrarily divide them so that approximately half would receive vaccine and half be held as controls. It was made clear that the private physician would have no voice in this selection. The inoculations were to be done in the physicians' offices during office hours and those selected would be notified by us when to report for vaccination. No effort was made to urge vaccination, or to urge physicians to recommend it.

Lists were first received from physicians during the third week in June. The method of selection employed was alphabetical. The names of applicants were arranged alphabetically and approximately the last half of each list was selected for vaccination, the first half being held as controls.

The physicians had some hesitancy in administering the vaccine and an effort was made for one of us to be present with each physician to assist in his first inoculations.

With the announcement of the Greensboro study, Dr. Brodie, who coöperated fully not only in supplying the vaccine but in every other manner possible, simultaneously discontinued sending vaccine to North Carolina except at our direction. Requests received by him from individuals and physicians were submitted to us. The requests coming through him, and those received directly from physicians in other parts of the state, were numerous, and much pressure was exerted on us by some physicians for vaccine for their children. These were uniformly refused with the statement that vaccine used under our supervision would be used only in controlled studies. Where possible we visited localities from which many requests were received, and because of such requests Wilmington and Washington, N. C., with the coöperation of the Health Officers, Dr. A. H. Elliott and Dr. D. E. Ford, were later selected for study sites. These were the only places in North Carolina offering the opportunity for such study.

A number of communities in Virginia requested that they be selected as study sites. In 6 of these places the problem was discussed with the health officers and physicians and the décision was reached that it was too late to attempt any work. However, in Petersburg, arrangements were made with the physicians and the Health Officer, Dr. Mason Romaine.

The same general procedure followed in Greensboro was used in these areas except that, profiting by the Greensboro experience, a time limit of 1 week was set for listing names; the upper age limit was raised to 10 years in Petersburg; and the administration of the vaccine was demonstrated to physicians as a group rather than by giving assistance to each individually.

In the 4 localities, 1,452 individuals, representing 7.2 per cent of the population of the ages involved, requested vaccine, of whom 766 were selected by the method described to receive it, and 686 were held as controls. Of the 766 selected, only 458 reported

for inoculation, representing 2.3 per cent of the child population.

Various methods of inoculation and various inoculation sites were used by individual physicians. Dr. Brodie has recommended 1 to 2 c.c. given intracutaneously, and the remainder of a 5 c.c. dose subcutaneously at each of the two dates of injections given 14 days apart. For uniformity of dosage we recommended 1 c.c. intracutaneously and 4 c.c. subcutaneously.

To avoid pain from the injection of such a large volume of vaccine, prior use of 0.5 per cent to 1.0 per cent novocaine was at first recommended. This was given up because the increased quantity of material necessarily injected in a small area, and the extra introduction of the needle seemed to outweigh the advantages of the novocaine.

Following Dr. Brodie's advice, it was recommended to administer the second dose on the 14th day following the first. Of the 458 inoculated, 422 received 2 doses and 36 only 1. Of the 422 receiving 2 doses, 326 (77 per cent) had their second dose on the 14th day; 16 (3 per cent) less than 2 weeks from the first; 70 (17 per cent) in the 3rd week, and 10 (2 per cent) over 3 weeks following the first dose.

Of the total number inoculated, 1.3 per cent were under 1 year of age; 48.9 per cent 1–4 years, and 49.8 per cent 5–10 years of age. Negroes comprised 16 per cent of those receiving vaccine.

REACTIONS

Physicians administering the vaccine were requested to record all local and general reactions. However, to make the observations uniform we attempted to see the vaccinated children at about the time of the second dose and about 1 month following it. At these visits inquiry was made regarding reactions; the inoculation sites were examined where possible; and inquiry was made regarding symptoms which might have represented unrecognized abortive poliomyelitis. Such visits were completed in 88 per cent of the vaccinated. Inquiry was also made in 71 per cent of the controls as to symptoms which might have resulted from unrecognized abortive poliomyelitis. This was in addition to the routine reporting by the physicians of all cases of suspected poliomyelitis to the health officer.

It was found that such follow-up visits were necessary to secure an estimate of the reactions. Either because the physicians' findings were not recorded, or because they did not see the patients again after vaccination, many reactions were noted only by means of our follow-up visits. For example, there was no note on the physicians' cards of 6 of the 14 abscesses which occurred. It also developed that 3 children recorded as receiving the vaccine had not been inoculated and that 4 controls had been inoculated with no record of the vaccinations given us. (These and 6 other controls inoculated and recorded are not included in the study group.)

On the basis of our records in the 403 vaccinated seen by us, and the physicians' records in 55 cases not seen by us, 229 individuals (50 per cent) were found to have had local reactions consisting of one or more of the following conditions:

a. Redness and swelling 1 inch or more in diameter and lasting longer than 48 hours
b. Local pain lasting longer than 48 hours
c. Local suppuration or necrosis
d. Induration lasting 3 weeks or longer

In the Greensboro series, where reactions occurred more frequently than in the other areas, reactions followed 48 per cent (178 out of 374) of the inoculations preceded by novocaine and in only 17 per cent (11 out of 64) of those not preceded by novocaine.

No novocaine was used in the other localities.

In the 4 study areas, 458 individuals received 880 inoculations—458 first doses, and 422 second doses. Local reaction of some degree followed 24 per cent (110) of the first inoculations, and 43 per cent (181) of the second.

As a group, the reactions from the second dose were generally more severe than those from the first although the doses were the same in amount. There was no correlation between local or general reactions and the time interval between the 2 doses.

Two children who had had antirabies treatment in the summer of 1934 had no local or general reaction following the Brodie vaccine.

Of the local reactions recorded, only 15 were out of the ordinary. One of these was a fairly severe urticaria occurring around the site of the subcutaneous inoculation on the 7th day in a child with an allergic history. Ten were abscesses at the site of the subcutaneous inoculation that were opened surgically or opened spontaneously, and 4 were fluctuant masses 1 to 2 inches in diameter which had not opened. Most of the abscesses cleared up promptly following drainage and local treatment; however, several were very slow to heal, the area filling in with indolent granulation tissue. There were also 15 instances of superficial slough 3 to 5 mm. in diameter at the site of the intracutaneous inoculation.

General reactions following the vaccine were observed in 17 children (3.7 per cent) and in 4 of them were, at the time, very disturbing. Résumés of the histories of these 4 are as follows:

1. Within 30 seconds after the administration of her first dose, a white female, 2 years of age, fainted, became cyanotic, and stopped breathing. After 10 to 15 minutes of manual and mouth-to-mouth artificial respiration she recovered and suffered no further ill effects. She had no reaction following the second dose.

2. On the 3rd day after vaccination, a white female, 5 years of age, developed what was diagnosed as an acute inflammatory rheumatism of both knees. She had high fever for 3 days, and was confined to bed for 10 days. When seen 3 weeks following vaccination, her knees were still swollen but not tender, and the child was extremely weak and underweight. Seen again 7 weeks after inoculation she had gained weight and strength and suffered no apparent disability. The second dose was not given.

3. About 10 minutes after the first dose, a white male, 5 years of age, felt faint, nauseated and became very pale. He had a "medicine taste" in his mouth. After lying down 30 minutes he felt all right. His parents state he now has no appetite, has lost weight and strength, and appears anemic and listless. He was not given the second dose.

4. A white male, 6 years of age, complains of occasional cramping pain in the leg, the site of the second subcutaneous inoculation. One month after vaccination these cramps are less frequent and less severe but still occasionally present.

An additional 13 children had fever of 101–104° for 1 to 2 days and were listless. Several of them had headaches and were nauseated. In 10 of these the fever occurred in the first 3 days. In the other 3 it was associated with abscesses and subsided when they opened.

GENERAL DISCUSSION

The evaluation of the efficacy of a vaccine against poliomyelitis introduces problems peculiar to any disease carrying a low morbidity rate and factors inherent in human nature itself. The sample of the population tested must be adequate enough, in point of numbers, to satisfy elementary requirements of the theory of probability. It must also be a good sample—"fairly representative qualitatively of the universe from which it is drawn." To get a good sample is primarily and

fundamentally a biologic problem and one which may involve intangible elements not easily susceptible to statistical treatment. It is usually relatively simple to obtain a good sample in regard to such variables as age, sex, race, and geographic location, or it is possible to correct for any discrepancies in these factors which may develop. It is impossible to determine what selective influences make one individual apply for a vaccine and another not apply; and further impossible to know what effect these factors might have on the results.

For example, 1,452 persons applied for vaccine. Following the receipt of applications, 15 cases of poliomyelitis were reported in other children of the same age in the same communities. The rate these cases represent out of the total child population, applied to the 1,452 applicants, gives an expectancy of 1.09 ± 1.03 cases among those in the study group. In other words, one would have expected the chance occurrence of from 0 to 2 cases in the study group. Actually, no cases were reported. The figures are too small for much significance but they make one wonder if people who applied for vaccine in this series, regardless of whether they were vaccinated or not, were not somehow less likely to acquire poliomyelitis than other individuals in the same communities.

It is therefore also obvious that the sample of population vaccinated should be adequately controlled with an equally large group of unvaccinated. It is not enough to vaccinate all applicants and retain as controls other children in the same community who did not apply. The division of the applicants into vaccinated and controls must be impartial.

The adequacy of the sample, in point of numbers, to satisfy elementary requirements of the theory of probability is amenable to calculation. In North Carolina counties where the studies were carried out, assuming that the attack rate observed this summer (approximately 60 cases per 100,000 of the population under 8 years of age) prevailed in the controls, and that the vaccine was 100 per cent effective, a sample of 20,000 candidates—10,000 vaccinated and 10,000 controls—would have been necessary in order that the difference between the number of cases in the vaccinated and the number in the controls be relatively free from mere chance. With the same rate in controls, and the vaccine only 80 per cent effective, a sample of 40,000 candidates would have been necessary. Of course, the inclusion of individuals of older ages in the study group would tremendously increase the size of sample required because of the sharp decline in attack rate as age progresses. The above figures are also predicated on reported cases, about 15 per cent of which were abortive. For an unequivocal evaluation it would probably be more rational to use only paralytic cases because of diagnostic difficulties and because paralysis is, after all, what it is desired to prevent. The sample necessary would be increased if it were calculated on the basis of the paralytic rate.

Selection of vaccinated and controls by the method used in these studies is, so far as we are aware, open to only one serious scientific criticism. Of the 766 selected to receive vaccine, only 458 reported for inoculation. We have no way of knowing how many of the controls, had they been selected, would have refused the vaccine. It must be stated, however, that in any method of using arbitrarily selected human controls, constant vigilance and supervision by an impartial observer appears necessary. Methods of circumvention of the rules set down are numerous, and for adequate studies must be carefully guarded against.

It therefore appears that the considerations brought out in this study—psychologic, administrative, and scientific—present problems which in the aggregate make the unequivocal evaluation of the efficacy of a poliomyelitis vaccine a matter of extreme difficulty.

SUMMARY

1. The administrative procedures employed in conducting field trials of the Brodie poliomyelitis vaccine in North Carolina and Virginia during the summer of 1935 have been outlined.

2. In the 4 study areas, 1,452 applications for vaccine were received, of which 766 were selected for vaccination and 686 held as controls. Four hundred and fifty-eight of those selected were inoculated, 422 with 2 doses and 36 with 1 dose. In addition, 10 controls were known to have been inoculated. No cases of poliomyelitis were reported in any of the 1,452 candidates, and hence no conclusions concerning the efficacy of the vaccine can be reached from this study.

3. Local reactions occurred in 50 per cent of those inoculated but were not of serious import except in 3 per cent (14 abscesses).

4. General reactions were observed in 17 instances (3.7 per cent), 4 of which were temporarily very disturbing.

5. In an area where the controls were as much spared from epidemic prevalence as were the children of the North Carolina counties where these studies were carried out, and with all possible safeguards as to impartial division of applicants, 10,000 vaccinated children, together with 10,000 controls would have been necessary to show conclusively the value of a perfect vaccine against poliomyelitis.

If the vaccine were only 80 per cent effective, a total of 40,000 children would have been necessary.

ACKNOWLEDGMENTS—The coöperation of Dr. Park and Dr. Brodie, the State Health Departments of North Carolina and Virginia and the health officers, physicians and public of the study areas, is gratefully acknowledged. It is impossible for one not implicated to appreciate the difficulties imposed on the health officers and the private physicians coöperating in a study of this sort.

The general planning and supervision of these studies were under the direction of Dr. J. P. Leake, Medical Director, U. S. Public Health Service.

Rat Extermination

IT has been called to the attention of the *Journal* that—". . . two men, R. N. and H. A. Ferris, brothers, the former in the early 20's and the latter about 30 years of age, are apparently touring the country offering to put on campaigns of rat extermination. They carry with them credentials which appear to be authentic as well as newspaper clippings endorsing the work. Their method of procedure seems to be to establish an alliance of some kind with local health departments. The plan that they outline for their campaign of extermination as well as the materials used are above reproach and would probably win the endorsement of any health official. Unfortunately, however, after operating for a term of several weeks and making as many collections as possible, the gentlemen above mentioned seem to have developed a habit of disappearing without leaving a forwarding address. By accident the writer was able to uncover the home of these gentlemen and a registered letter with return receipt requested was addressed to one of them, requesting a statement as to their intentions for completing the work which they had undertaken locally. The receipt has returned, but to date no reply to the letter."

M. McC. F.

Active Immunization Against Poliomyelitis*

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FOR the past 5 years, we have carried out experiments with a view toward developing a safe and effective method of immunization against poliomyelitis. In this paper, we propose to give a report of our approach and to present the data collected up to the present time.

Using *Macacus rhesus* monkeys, three methods were tried. These included the use of sub-infective doses of active virus, virus-serum combinations, and germicidally inactivated virus.

The use of active virus was, as one would expect, the most effective, but it proved dangerous, for some of the animals developed the disease during the course of immunization. Since, neither in poliomyelitis nor in other virus diseases is there any evidence for the belief that the virus loses its infectivity for man through animal passage, it was not deemed advisable to try it in the human.

Virus-serum combinations produced immunity but were difficult to standardize.

Therefore, germicidally inactivated virus was resorted to, inasmuch as the experiences of Bedson [1] and others with the viruses of herpes, psittacosis, fowl-plague, foot and mouth disease, and rabies, indicated that after chemical treatment, immunization could be obtained with non-infective preparations, whereas heat killed material was ineffective.

In a recent article Flexner [2] maintained that there was no evidence to show that germicidally inactivated virus engendered immunity. However, he refers to experiments involving too few animals to be significant. Moreover, in that work no significance was attached to the importance of treating the virus so as to render it non-infective, but not overtreating it. In our work it was found, in both monkeys and children, that when formalin acts upon the virus for the minimum amount of time necessary to render it non-infective, the material is superior to virus that is overtreated. This is in keeping with similar findings by Bedson and others for foot and mouth virus.[3] In fact, as we will point out, storage for more than 2 to 3 weeks at icebox temperature, which allows overaction of the formalin, renders the vaccine non-antigenic. Moreover, with germicidally inactivated viruses, as has been shown by the work of MacKenzie [4] and others, it is necessary to use large doses. In both monkeys and humans we found this to be the case in immunization against poliomyelitis.

With freshly prepared material, inactivated for just the proper length

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of time, and given in large doses, we have been able to demonstrate serum antibody in monkeys. Likewise, both Olitzky[5] of the Rockefeller Institute, and Schultz[6] of Stanford University have reported antibody production in monkeys with formalized vaccine. They failed to demonstrate any resistance to intracerebral inoculation with their test, which was more severe than we used for the demonstration of tissue immunity. We have reported that even large amounts of active virus given to monkeys immunized them against only small or moderate intracerebral doses of virus. The method for demonstrating such a fine degree of immunity has been to carry out simultaneous titrations of the virus in a series of 8 monkeys, putting 2 animals on each of 4 doses. The immunized animals receive 1 to 3 times the smallest amount of virus that produces complete paralysis in both monkeys in the usual incubation period.

When serums are tested, the neutralizing power is estimated as the number of minimal completely paralyzing doses that the serum neutralizes—many times the smallest dose that brings down the controls. That such a method gives reasonable accuracy is indicated from the following results of titration:

During the time the monkey experimental work was being carried out, 94 animals were used in titrating the virus. Of 60 monkeys which received the minimal, or 2 to 4 times the minimal, completely paralyzing doses, 57 came down with complete paralysis in the usual incubation period. Only 2 of the other 34, which received less than the estimated infective dose of virus, succumbed to the disease.

During the past 16 months, because of the large number of monkeys used, it has not been possible to keep them for a long enough time prior to inoculation to get them on uniform rations and to weed out those with intercurrent infection. As a result, the virus titrations have not been so constant, and, to offset this, sera are tested prior to receiving vaccine on 5 to 10 infective doses respectively, and multiples thereof. After vaccination the sera are tested against 40 and 80 infective doses and multiples thereof. The test for antibody in humans, therefore, is sufficiently coarse to meet the criteria of antibody in the hands of others.

Like Flexner, who has pointed out that there is no evidence to believe that monkey passage virus is non-infective for man, we have felt the use of non-infective material the safest procedure and therefore worthy of extensive trial to determine whether or not whatever immunity it produced would be sufficient to protect children against the disease. The safety of the vaccine is indicated by the fact that intracerebral and intraperitoneal inoculations have failed to infect monkeys. In addition, the formalin in the concentration used renders non-infective choriomeningitis, herpes, and other viruses, and so should render inert any chance virus the monkey may carry. We realize that should active immunization protect against the disease, it will not completely solve the problem of poliomyelitis because of the difficulty of vaccinating so many in the absence of a susceptibility test. However, we do not agree with Aycock and others who maintain that the procedure is unwarranted because of the relatively small number of susceptible individuals. To maintain that infection with the virus of poliomyelitis is a question of susceptibility entirely, is an assumption, as we will point out later.

Those most likely to contract poliomyelitis are children below 10 years of age. The greatest incidence of the disease is in the 1–5 year group and in the 6–10 year old group, which is in keeping with the larger proportion in these groups who show no antibody,

and the low average level of such a group. This is indicated in Table I where the amount of antibody is designated as none, where the 0.9 c.c. of serum neutralizes less than 10 infective doses of virus, slight amounts, where it neutralizes 10–50 infective doses, which is probably an almost negligible amount, moderate, neutralizing 50–200 infective doses; and considerable amounts in which more than 200 infective doses are neutralized. Thus it would seem that the lack of antibody is a factor predisposing to the disease inasmuch as over 85 per cent of those under 5, and over 70 per cent of the 6–10 year old group show no antibody or only a small amount of antibody.

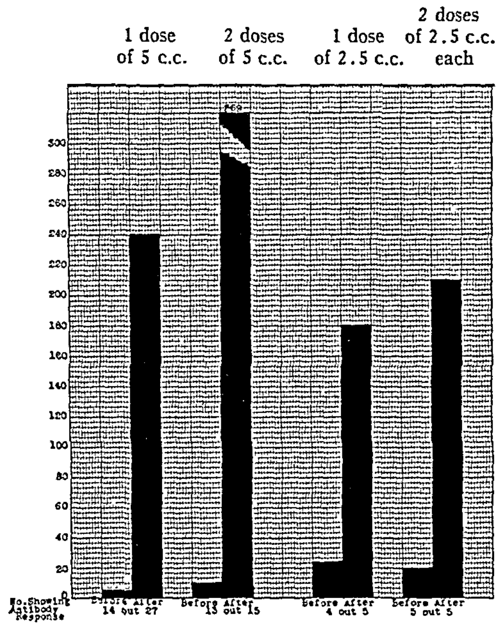
This does not explain why in an epidemic approximately only 1 of the 170 children under 5 showing no antibody, and about the same proportion of those under 10 develop the disease. This may be due to the individual non-specific variation in the susceptibility of the children, or the size of the infective dose, or number of exposures, or the accessibility of the virus to the olfactory fila.

Until these or other factors in the epidemiology of the disease are understood, then mass immunization, though wasteful, is a logical procedure.

IMMUNIZATION OF CHILDREN

This study consists of 2 parts, (1) the determination of antibody in approximately 150 children, and (2) field studies.

GRAPH I—Antibody Response to one and two doses—5 c.c. or 2.5 c.c.



ANTIBODY RESPONSES

These may be summarized as follows:

1. The immune response was proportional to the size of the dose tried for as Graph I indicates, with 5 c.c. doses the response was decidedly better than with 2.5 c.c. amounts.

2. As would be expected, where antibody was already present the response was decidedly better and in keeping with the amount of natural antibody present.

3. In the absence of any natural antibody, 60 to 65 per cent responded to a single, and nearly 90 per cent to 2 doses. Throughout, 2 doses gave a greater incidence, degree and duration of immunity than did 1 dose, as is indicated in Graphs I, II, III, *and* IV. *In* Graphs II and III are recorded the data collected from tests done on the serum of a small group of children at various intervals

TABLE I

NORMAL URBAN ADULTS

	No Antibody Neutralizes Less 10 M.C.P.	*Slight Antibody Neutralizes 10–50 M.C.P.*	*Moderate Antibody Neutralizes 60–200 M.C.P.*	*Considerable Antibody Neutralizes 200+ M.C.P.*	*Total*
6 mo.– 1 yr.	5	2			7
2 yr.– 5 yr.	54–62.8%	19–22.1%	11–12.8%	2– 2.3%	86
6 yr.–10 yr.	15–38.5%	13–33.3%	9–23.1%	2– 5.1%	39
11 yr.–17 yr.	0	1– 6.25%	5–31.25%	10–62.5%	16
Adults	1– 2.6%	2– 5.3%	6–16%	28–76%	37

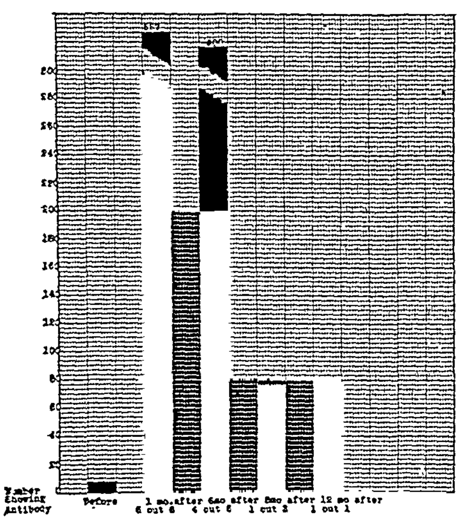
after immunization. The group which received a single dose responded exceedingly well, but the antibody fell off rather rapidly so that in several children it had almost completely disappeared in 5-8 months. Following the administration of 2 doses the antibody produced was still present at 5-8 months in all the individuals tested and could be demonstrated in 4 out of 6 tested 1 year after immunization. Where 1 dose failed, a second often produced a response as indicated in Graph IV, where after a single dose no antibody developed in a child, but after the second considerable antibody could be demonstrated. Similar findings were obtained in 6 out of 7 children. When the antibody disappeared after a single dose, it sometimes responded rapidly to a second dose. Three children from whose serum the antibody had disappeared within 6 months after the first dose were given a second dose, and a fourth child was given a second and third dose. All showed considerable antibody which persisted for a longer time than after the first inoculation.

Upon using brain stem as well as cord for preparation of the vaccine it was inactivated in a shorter period of time. Several series of children were given different batches of vaccine incubated with formalin for different periods. Although the groups were small, the results given in Graph V indicate that with the longer exposures to formalin less antibody develops.

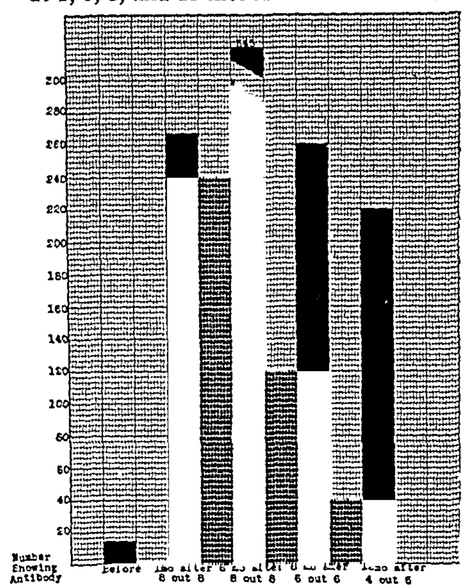
The vaccine does not keep well in storage. It was shown both in humans and monkeys that after storage for 1 month the vaccine produced but little antibody, and that after 2½ months at icebox temperature no antibody response could be demonstrated. It is interesting to note that at Seaview Hospital, New York, 1 of 4 children given vaccine which had been stored for 2½ months and who showed no antibody after immunization, contracted poliomyelitis. At this institution none of the 39 children given freshly prepared material developed the disease, whereas 1 of the non-vaccinated children came down.

Antibody can be demonstrated about 1 week after injection and reaches its height in 3 to 4 weeks. Therefore, no protection can be expected unless the person has received the vaccine at least 3 weeks prior to exposure. Thus, the

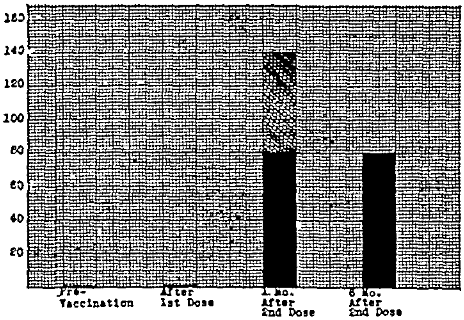
GRAPH II—Antibody Response—Single dose at 1, 6, 8, and 12 months after vaccination



GRAPH III—Antibody Response—Two doses at 1, 6, 8, and 12 months after vaccination



GRAPH IV—One Dose—No Response. A Second Dose—Antibody Response

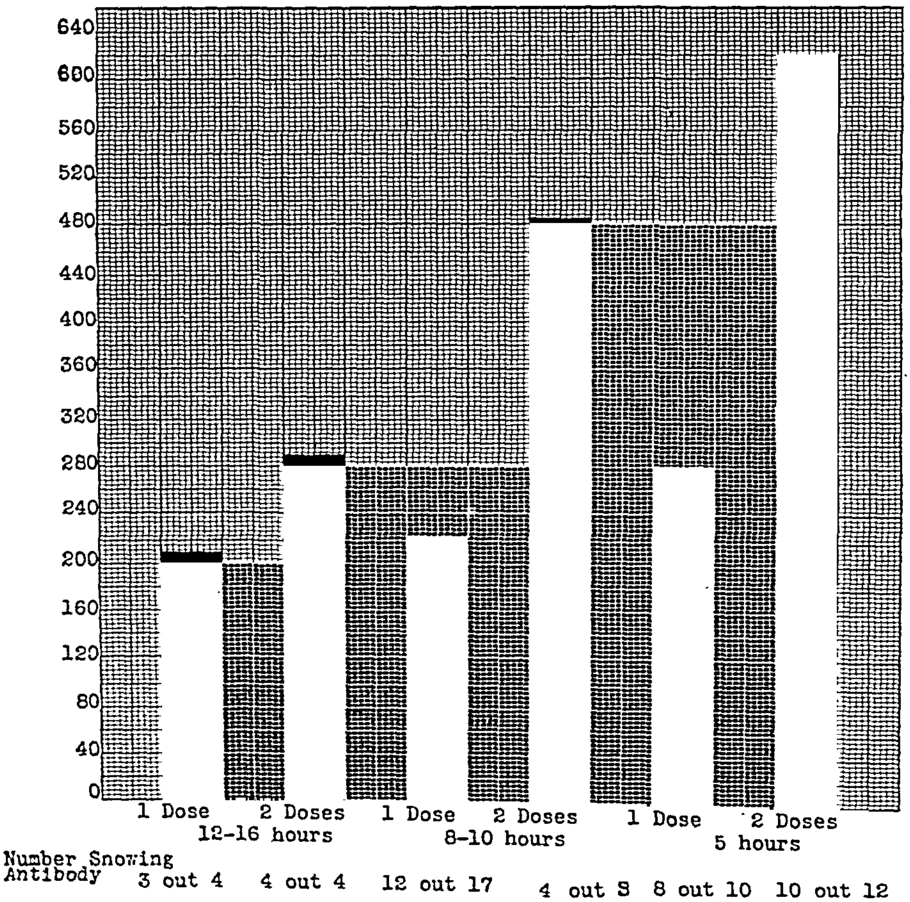


vaccine will be of no value where exposure has already taken place.

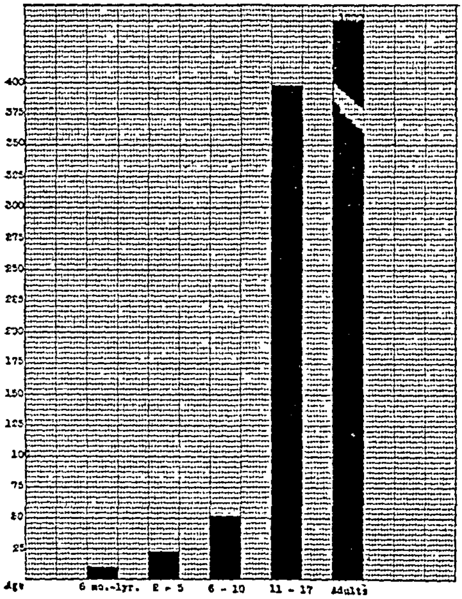
FIELD STUDIES

Up to the present more than 9,000 individuals have received vaccine. Inasmuch as more than 7,000 of these were in endemic or epidemic foci, it is quite likely that they were exposed to the virus. The control group, of non-vaccinated children consists of about 7,500. Of these approximately 4,500 were in exposed areas and can be compared with the similar group of 7,000 vaccinated. In so far as possible each vaccinated individual was matched with a control in the same district and of the same age. Wherever possible playmates were used. The details of the method of control have been discussed previously. Less than 1 per cent of those given the vaccine developed a general reaction. In cases where reaction did occur, it usually passed off in less than 24

GRAPH V—Antibody Response to Various Periods of Inactivation in Children with Little or No Pre-vaccinal Antibody



GRAPH VI—Antibody Levels in Normals



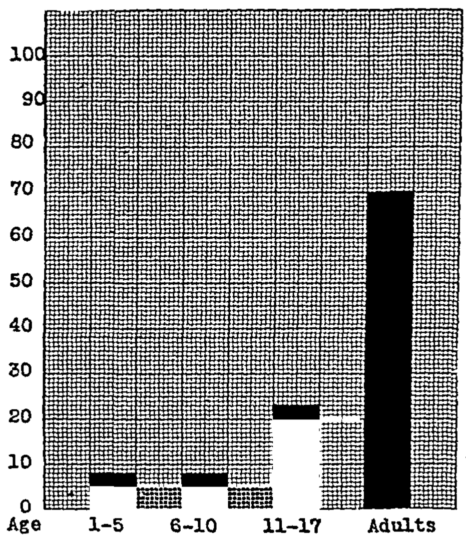
hours. About 2 per cent had local reactions such as induration and slight superficial necrosis, or occasionally a small abscess.

The vaccinated group included 564 individuals who were vaccinated after a definite history of exposure. Three of these developed the disease on the day of injection, and 1, 13 days later. The latter developed as a fulminating bulbar case. Inasmuch as it takes at least 3 weeks to obtain the full response from the vaccine, one cannot expect protection after exposure.

Of those vaccinated prior to exposure the largest groups were in North Carolina; Kern County, Calif.; and at the Los Angeles County hospital. The first group will be reported upon in detail by Dr. Gilliam. The second group has been reported on by Drs. Joe Smith and M. A. Gifford in their annual report, at which time somewhat over 3,000 had received vaccine. Nearly an additional 1,000 have since been injected. None of those vaccinated after exposure contracted the disease.* Dr. Emil Bogen, in reviewing the statistical data, states that, judging from the general incidence of the disease, one would have expected 3 to 5 cases to occur in the vaccinated group. In the town of Taft, where 652 were vaccinated and controls set up, 2 in the control group contracted the disease. Of the 200 on the staff of the Kern County hospital who received the vaccine, none contracted the disease, although the incidence was high among attendants of neighboring hospitals, such as those of Los Angeles County, Orange County, and Fresno County. Since all of the hospital staff were vaccinated, there were no controls for evaluating the vaccine.

At the Los Angeles County Hospital, where more than 300 nurses and physicians were vaccinated, Dr. Kessel reported that in one group of 42 vaccinated (15 received Kolmer vaccine) none came down with the disease, whereas 3 of the control group of 50 contracted poliomyelitis.

GRAPH VII—Antibody Levels in Poliomyelitis



* We have recently learned of a case developing 13 days after a single dose. A similar second case has only been reported, but the diagnosis is not certain.

DISCUSSION

These studies have brought out the fact that a formalized vaccine produces some antibody in both monkeys and humans. That antibody is an indication of some real immunity is based upon the following evidence:

1. In keeping with the findings of others, we have shown that the incidence and degree of antibody (Table I, Graph VI) increases with age, which correlate with the lower incidence of the disease in the higher age groups, so it would appear that the presence of this antibody is a factor in protecting older children and adults from the disease.

2. In comparing the immunity developed after the injection of active virus with that following the administration of formalized virus, it was found that with living virus the degree of both tissue and humoral immunity was higher.

3. The antibody content of a group of paralytic poliomyelitis cases was tested during the first week of the disease and compared with that in normal individuals. The presence and amount of antibody were compared for different age groups. It was found in the small group tested that persons with acute poliomyelitis usually had little or no antibody. Inasmuch as the level of antibody seems decidedly lower in poliomyelitis than in so-called normal individuals, as demonstrated in Graphs VI and VII, we feel that the lack of specific antiviral substance is one of the determining factors that predisposes individuals to poliomyelitis.

When the virus enters the nose, the antibody present in the nasal secretions, if in sufficient quantity, may neutralize the virus. Should this, the first line of defense, fail, then the virus can get to the central nervous system, where it may or may not multiply, depending upon the resistance of the cerebrospinal axis.

The combined humoral and tissue immunity of children can be tested only in following up the outcome of natural exposure. Up to the present, none * of nearly 7,000 who were probably exposed, after vaccination with fresh vaccine was completed, have contracted the disease, whereas 5 of a smaller control group have come down.

The field trials must continue on a still larger scale to give the final answer. We feel that further work in this direction is merited because:

1. The vaccine is non-infective upon intracerebral inoculation into monkeys and from all experiences to date appears to be harmless.

2. Some immunity is developed and although evidenced only as antibody production, we have indicated its importance in the mechanics of protection.

3. Immunization against other virus diseases such as rabies, encephalomyelitis and louping-ill, has been obtained under field conditions with similar types of vaccine.

CONCLUSIONS

A formalized poliomyelitis vaccine which fails to infect monkeys after intracerebral inoculation and so probably is safe, stimulates antibody.

The present inadequate data have been favorable, and do not show that the vaccine does not immunize.

Field studies on at least 50,000 more children should continue in order to reach a positive evaluation.

* We have recently learned of a case developing 13 days after a single dose. A similar second case has only been reported, but the diagnosis is not certain.

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Vaccination Against Acute Anterior Poliomyelitis*

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BEING convinced by reasons fully discussed elsewhere [1] that effective vaccination against acute anterior poliomyelitis requires the administration of active virus, I have employed as a vaccine for the immunization of monkeys and human beings a 4 per cent remote monkey passage virus treated with 1 per cent sterile solution of sodium ricinoleate.[2] This concentration of sodium ricinoleate, however, being very low in bacteriostatic and bactericidal activity, did not prevent the accidental contamination with *B. coli* and a staphylococcus of 3 lots of vaccine prepared in the Research Institute of Cutaneous Medicine, so that the method of preparation was later changed to include 1:80,000 phenyl-mercuri-nitrate. This was found sufficient for protection against contamination during the preparation and administration of the vaccine without producing any material reduction in its immunizing properties.[3]

Since I believe that the method of preparation bears an important relation to the safety of the vaccine for both monkeys and human beings, it may be well to state that it is prepared of spinal cords from paralyzed monkeys following intracerebral inoculation with a remote passage virus. The cords are first kept in 50 per cent glycerol for at least a week, and then *very finely divided* in order to permit thorough mixture of the virus with the sodium ricinoleate and phenyl-mercuri-nitrate at 37° C. for 24 hours, followed by 10 to 14 days in a refrigerator at 10° to 12° C., with daily shaking, when cultural and mouse inoculation tests for sterility are conducted. The brain and cord of each monkey are tested in the meantime for the virus of lymphocytic chorio-meningitis (Armstrong) by intracerebral inoculation of mice which has not been encountered in a single animal.

ATTENUATION OF VIRUS AND OTHER FACTORS OF SAFETY

I believe that the virus in vaccines prepared in this manner has undergone some reduction in virulence or infectivity, which I first designated as devitalization and later as attenuation, but still retains some active virus. As a rule, the intracerebral inoculation of young monkeys with 0.3 c.c. of vaccine has produced some paralysis within 3 weeks and usually within 12 days, but not infrequently this appears more slowly and less severely than when monkeys of approximately the same weight and age are inoculated intracerebrally with 0.3 c.c. of a 4 per cent suspension of fresh untreated virus. The age and weight of *Macacus rhesus* monkeys have been found to have an important influence upon susceptibility,

* Read at the Fourth Annual Meeting of the Southern Branch, American Public Health Association, in St. Louis, Mo., November 19, 1935.

but it has been very difficult to gauge the degree of attenuation of virus by this means.

However, and more important, none of a series of 42 monkeys receiving the vaccine in doses as large as 0.5 c.c. per kg. (corresponding to as much as 5 c.c. for a child of approximately 25 lb.) every 5 days in 5 subcutaneous injections has developed any evidences of poliomyelitic infection, whereas in a control series of 20 monkeys receiving 5 similar doses of fresh untreated virus paralysis developed in 1. Under the circumstances I believe that the manner of preparing the vaccine has resulted in some reduction of infectivity of the virus. This is not due to a mere dilution of the virus, as the amount administered has been the same; but it may be a quantitative change in the sense that the method of preparing the vaccine may result in the inactivation of some of the virus. Nor can it be stated that the reduction in virulence of the virus by treatment with sodium ricinoleate and phenyl-mercuri-nitrate is permanent, as the virus recovered from the cords of monkeys paralyzed by intracerebral injections of the vaccine has usually been found apparently as virulent as untreated virus.

Therefore I think it is better to speak of the effects of sodium ricinoleate and phenyl-mercuri-nitrate upon the virus as being one of slight devitalization or attenuation, although I believe it is a reasonable assumption that some mutation of the virus for human beings may have resulted from the very large number of times in which it has been passed through monkeys. This, of course, has not been proved as it would require the subcutaneous injection of susceptible human beings with fresh unchanged virus, but the probability and possibility exist. Furthermore, while it is possible to produce paralysis of monkeys by intracerebral inoculation with human spinal cord virus, yet this is by no means easily accomplished, indicating that human virus usually requires some adaptation to the monkey before uniformly successful infection can be accomplished. It would appear that Dr. William H. Park shares this opinion, judging from his recent statement[4]:

> It is also known that it is difficult to adapt the human virus of infantile paralysis to monkeys so that they will develop an attack. The reverse of this is probably true: that a virus adapted to infect monkeys has lost much of its virulence for man.

Furthermore, it appears that the subcutaneous route of administration of the vaccine is an additional factor of safety. As stated, none of 42 monkeys receiving the vaccine by this route in relatively large doses has developed evidences of infection, and only 1 in a series of 20 receiving fresh untreated virus, even though the latter has been well adapted to this animal, nor have I been successful in infecting monkeys with human virus by this route although I hasten to add that it has been attempted with the virus from but 5 human spinal cords. I may state that the results of unpublished experiments indicate that it is even more difficult to infect monkeys with intracutaneous injections of passage virus; but I believe the results with subcutaneous injections justify the assumption that this route of administration is not favorable to infection. This opinion is also apparently shared by Dr. Park who has recently stated[4]:

> It is known that when intradermal or subcutaneous methods of injection are used, it is difficult to infect monkeys. There is every reason to believe that this is true of children.

Additional factors of safety in the subcutaneous or intracutaneous administration of the vaccine may be our custom of giving 3 small doses and the rapidity with which neutralizing antibody is apparently produced in some

children[5] and immunity in some monkeys.[6] I am perfectly aware that the amounts of vaccine advised for the immunization of human beings are less than found necessary for monkeys, but I have thought it likely that children will require much less immunization for protection against chance natural infection from contact with carriers or cases of infantile paralysis than is required for the protection of monkeys inoculated by the intracerebral injection of 10 or more minimal infective doses of virus.

It is for these reasons that I have regarded the vaccine as safe for the immunization of human beings when prepared exactly as described.[3] Certainly we have had no success in the immunization of monkeys with vaccines of virus "killed" or inactivated by heat, chloroform, phenol, or formalin. For this reason I believe that effective vaccination requires the presence of some active virus in the vaccine, and in this connection may state that on one occasion we found our vaccine ineffective in the immunization of monkeys when devitalization of the virus was carried out to the point where the intracerebral inoculation of 5 monkeys with 0.3 c.c. produced only mild paralysis of one arm of one of the animals. Why the presence of active virus is apparently required is discussed elsewhere in more detail,[1] but I may mention here that effective immunization in virus diseases may require the prolonged or persistent sojourn of the viruses in the hosts as stated by Rivers,[7] and if this is true of poliomyelitis, it is not unlikely that completely inactivated vaccines cannot produce effective and durable immunity in this disease.

DISTRIBUTION AND ADMINISTRATION OF THE VACCINE

Following our initial immunization of 2 adults and a group of 25 children varying in age from 8 months to 15 years, with absolutely no ill effects,[5] we have during the past 9 months administered the usual 3 doses to 446 additional individuals in Philadelphia,* 319 of whom were children from 6 months to 15 years of age, with no ill effects aside from some local reactions. In this connection I may state that the number of reported cases of poliomyelitis in Philadelphia during this period has been but slightly above the normal rate, which fact I mention because the low rate greatly reduced the chances of giving the vaccine during the incubation period at a time too late to prevent the disease.

Since April the Research Institute of Cutaneous Medicine has distributed 13,112 c.c. of the vaccine to 582 physicians in 36 states, including Canada, mostly in the epidemic areas, and the William S. Merrell Company of Cincinnati have distributed an additional 8,910 c.c. to 137 physicians in the same areas. These amounts, totalling 22,022 c.c. distributed through 719 physicians, have been sufficient for the immunization of over 12,000 individuals (mostly children). Reports have been received up to the present covering the immunization of 8,272 receiving Research Institute vaccine, and 2,007 receiving the Merrell vaccine, a total of 10,725 individuals, including the Philadelphia group, receiving the vaccine divided according to age as follows:

Under 4 years of age,	3,307 or	30.8%
4 to 15 years of age,	6,425 or	60.0%
Over 15 years of age,	993 or	9.2%

REACTIONS

With sterile vaccine, and especially that prepared with the addition of 1:80,000 phenyl-mercuri-nitrate, about 91 per cent had no local reactions aside

* I am indebted to Dr. George F. Klugh, Jr., and Dr. Robert Glenn for assistance in the immunization of these individuals in the clinic established at Temple University Hospital, January 26, 1935.

from slight stinging pain immediately after injection, followed by very slight tenderness for a day or two. In about 9 per cent the local reactions have been comparable to those produced by injections of diphtheria toxoid. Older children and adults have had more reactions than young children. Among the children receiving the 3 contaminated lots of vaccine from the Research Institute of Cutaneous Medicine, abscesses with constitutional symptoms developed in 26, who promptly recovered after drainage. There have been no severe local or constitutional reactions and no abscesses following the injection of vaccine carrying the 1:80,000 dilution of phenyl-mercurinitrate.

Constitutional reactions of slight fever, malaise, headache, some muscle stiffness, and anorexia with slight leukocytosis, subsiding in 24 to 48 hours, occurred in approximately 1 to 2 per cent of those inoculated with sterile vaccine. While skin tests on a small group of normal adults and children[8] have shown no evidences of a natural allergic sensitization to monkey spinal cord protein, there has been 1 case of allergic asthma reported to me following the administration of the vaccine, and a second patient in our clinic developed a mild urticaria following its administration. There have been no instances of demyelinization encephalomeningitis, such as have been reported in connection with the administration of rabies vaccine and regarded by some investigators as due to acquired allergic sensitization to spinal cord substance.

No instances of lymphocytic choriomeningitis have been reported to me following the administration of the vaccine, and we have not yet encountered the virus in the brains or spinal cords of our poliomyelitic monkeys by intracerebral inoculation of mice.

Since the vaccine has been given so extensively and with no restrictions whatsoever in the epidemic areas with consequently greatly increased chances of its administration to individuals during the incubation period, I have always expected that there would be at least some cases of poliomyelitis receiving the vaccine too late to prevent the disease. This possibility and probability were particularly impressed upon me by the fact that the great majority of individuals are apparently infected not by contact with actual cases but by carriers in which the duration of the primary incubation is in truth unknown and likely to be quite variable. Among approximately 11,000 immunized individuals, poliomyelitis developed in 10 who had received 1 or 2 doses of vaccine furnished by the Research Institute of Cutaneous Medicine. In at least some of these, it is a reasonable assumption that the vaccine was not responsible for the attacks, and in no instance has poliomyelitis developed after the full 3 doses of vaccine had been given. The essential facts of these 10 cases are as follows:

ABSTRACTS OF 10 CASES DEVELOPING POLIOMYELITIS

Case 1—The first instance reported to me by Dr. F. Kessel, of Los Angeles, was an adult exposed to the disease, who received 0.5 c.c. of the vaccine 4 days before the onset of a mild attack, exhibiting weakness in both legs and arms. It was obvious that this attack could not be ascribed to the vaccine, and this same lot was administered by Dr. Kessel to 82 additional individuals as well as to 310 (mostly children) in the southern states and our clinic, with no instances of poliomyelitis infection.

The next 2 cases occurred in the practice of Dr. Arthur Heyman of Newark, N. J., where a number of cases of poliomyelitis occurred during the past summer.

Case 2—Sally G., age 5¼ years. On July 5 and 11, the vaccine was given subcutaneously in alternate arms with practically no local or general reactions. July 13, very

transient pain in the back of the neck; July 14, some irritability; July 15, fever, frontal headache, neck stiffness, and vomiting; July 17, stiffness of the neck, with positive Kernig and Brudjinski reflexes; a spinal fluid examination showed a pleocytosis of 260 cells per c.mm.; July 19, flaccid paralysis of the left arm followed by improvement.

If the symptoms presented on July 13 were those of poliomyelitis, as appears probable, the attack began 8 days after the first, or 2 days after the second dose of vaccine. Dr. Heyman did not ascribe the attack to the vaccine, and thought that the two injections may have aided in confining the poliomyelitis to the mild and localized paralysis which in his experience was unusual in a case presenting so much constitutional reaction. The parents insisted upon the immunization of another child in this family.

Case 3—Victor P., age 8½ years. August 7, symptoms of an upper respiratory infection with malaise, irritability, etc.; August 10, given a subcutaneous injection of 0.25 c.c. of vaccine in left arm; August 11 to August 16, mild fever with persistence of upper respiratory symptoms; August 18, some tenderness in right deltoid muscle but no paresis or paralysis when examined by Dr. Danzis; August 27, weakness of the right deltoid muscle. No spinal fluid examination.

Dr. Heyman thought it possible that this child may have had the premonitory symptoms of poliomyelitis on August 7 before the vaccine had been given and that indeed its administration may have aided in rendering the attack very mild. He suspected that infection may have taken place in a swimming pool, as another unvaccinated child developed a severe bulbar type of poliomyelitis apparently from the same source at the same time.

Dr. Heyman gave the same lots of vaccine to 30 additional children under 4 years of age, to 42 between 5 and 15 years, and to 1 over 15 years of age with no evidence of poliomyelitis infection. Both lots were also given to 3 children by Dr. M. G. Dubois, to 5 by Dr. J. B. Rothstein, to 8 by Dr. S. B. Rawitz, to 4 by Dr. G. A. Holland, to 5 by Dr. Harry A. Brotman, to 59 by Dr. A. S. Finkelstein, and to 12 by Dr. R. N. Shapiro, all of Newark, N. J. Of 189 individuals, 54 were children under 4 years of age. The same vaccine was also given to 280 additional children in the southern epidemic areas and my clinic in Philadelphia with no ill effects.

Curiously enough, the next 3 cases also occurred in this same area in the practice of Dr. Richard C. Peters of Plainfield, N. J.:

Case 4—David C., age 10 years. August 24 and August 31, subcutaneous injections of vaccine in the left arm; September 3, developed headache with pain in neck and spine with fever, nausea and vomiting; September 4, rigidity of neck and spine with tremor of both arms. A spinal fluid examination showed 450 cells per c.mm. with a slight increase of protein. At this time 20 c.c. of convalescent immune serum were administered. September 5, flaccid paralysis of right arm followed by death on September 6. No autopsy was conducted.

Case 5—Hugh McD., age 5 years. August 4, first dose of vaccine by subcutaneous injection in left arm; August 31, second dose in left arm; September 6, slight fever and vomiting. An examination of the spinal fluid showed 250 cells per c.mm. September 7, paralysis of legs and arms with death September 9. No autopsy was conducted.

Case 6—Esther P., age 22 months. August 24, first dose of vaccine by subcutaneous injection in left arm; September 5, second dose in left arm; September 11, developed fever, headache, and vomiting, with stiffness of the spine. A spinal fluid examination showed the presence of 760 cells per c.mm. with a slight increase of protein. A transfusion of 350 c.c. of blood from a convalescent case was given, followed by 40 c.c. of convalescent immune serum on September 12; September 14, paralysis of left leg and both arms, ending fatally September 16. No autopsy.

Dr. Peters had given the same vaccine to 49 additional children, 29 of whom were under 4 years of age; Dr. L. D. Williams to 50 children, 15 of whom were under 4 years of age; and Dr. F. W. Lathrop, all of the same city,

to 4 children without any ill effects aside from some local reactions. The same lots were also administered to 262 individuals (mostly children) in other epidemic areas, and to 59 children in our clinic with no ill effects aside from some local reactions.

Case 7—A boy 5 years of age in the practice of Dr. M. W. Sinclair, Bluefield, W. Va. August 20, 0.25 c.c. of vaccine by subcutaneous injection in an arm; August 27, 0.5 c.c. of vaccine by subcutaneous injection in an arm; August 30, headache and vomiting; August 31, tenderness of neck and back with rigidity. Spinal fluid examination showed 648 cells per c.mm. with slight increase of globulin. September 1, paralysis of diaphragm and death. No autopsy.

Case 8—A girl 6 years of age in the practice of Dr. Sinclair. August 20, 0.25 c.c. of vaccine by subcutaneous injection in an arm; August 27, 0.7 c.c. of vaccine by subcutaneous injection in an arm. On September 3, she became acutely ill with poliomyelitis, developing paralysis of the left arm September 6, of the right arm September 8, and of the left leg September 9; September 11, she rapidly improved, talked freely, moved both arms and legs, and has since greatly improved.

Dr. Sinclair had 2 cases of poliomyelitis and 21 additional cases with positive spinal fluid changes, which were either abortive types of poliomyelitis or instances of lymphocytic chorio-meningitis, among unvaccinated children. He gave the same vaccine to 14 additional children with absolutely no ill effects other than very mild local reactions. The lot of vaccine used by him was also given to 93 children, 28 of whom were under 4 years of age, by Dr. R. R. Stuart; to 66 children, 19 of whom were under 4 years of age, and 4 adults by Dr. F. N. Andrews; and to 123 children, 23 of whom were under 4 years of age, and 11 adults by Dr. H. R. Connell, all of Bluefield, as well as to 222 additional individuals (mostly children) in other epidemic areas and in our Philadelphia clinic, with no ill effects. In Case 8 the sudden improvement of the child on September 11, followed by very satisfactory recovery, again suggests that the two doses of vaccine may have contributed to recovery possibly by aiding in the production of antibody.

Case 9—Marie De W., age 8 years; Dr. John M. Higgins, Sayre, Pa. September 8, 0.25 c.c. of vaccine by subcutaneous injection in left arm; September 15, 0.5 c.c. in left arm; September 16, nausea with some pain in the neck; September 17, nausea, vomiting and some pain in the neck; September 18, fever, hypersensitiveness and some abdominal discomfort. Reflexes normal. Later evidences of respiratory paralysis with death on September 19. No autopsy.

Three other children of the same family, 5, 9, and 11 years respectively, were also given the same vaccine with temporary systemic reactions but no other ill effects, and 3 additional children, 5 to 13 years of age, and 6 adults were inoculated with vaccine during the same period with no ill effects. Three doses of the same lot were also given at weekly intervals to 446 individuals (mostly children) in other areas, as well as to 62 children in our clinic, with no ill effects. Through the kindness of Dr. S. D. Conklin, of Sayre, I was able to examine the balance of vaccine in the vial employed in Case 9 and found it sterile upon culture. The intracerebral inoculation of a monkey with 0.3 c.c. produced paralysis 14 days later, but a second animal receiving 5 subcutaneous injections of 0.5 c.c. per kg. every 5 days (corresponding to about 10 c.c. per 50 lb. of weight) were without any ill effects whatsoever.

Case 10—Billy P., age 4 years; Dr. Walter Freeman, Washington, D. C. September 6, 0.25 c.c. of vaccine by subcutaneous injection in the left thigh; September 13, 0.5 c.c. of vaccine in the left thigh; September 14, fever, vomiting, restlessness and pain in the back of the neck; September 17, weakness of the extensor muscles of the right leg, loss of patellar and achilles reflexes, slight fever; September 20, improvement; Novem-

ber 8, striking improvement with almost complete recovery.

This child was in Elizabeth City, N. C., from August 31 to September 3, where, I am informed, there were no reported cases of poliomyelitis. Maids in the family were in a locality of the same state where some cases had occurred. The father, Dr. Matthew W. Perry, was in contact with a case on September 4. Dr. Perry had given the vaccine to Mrs. Perry and his two other children at the same time with no ill effects. Dr. Freeman also gave the same vaccine to 8 additional children, 3 of whom were under 4 years of age, and 2 adults, with no ill effects aside from mild local reactions. The same lot of vaccine was also given to 190 additional individuals (mostly children) in other areas, and to 19 in our clinic, with no ill effects aside from some mild local reactions. On November 8, Dr. Perry kindly wrote me that since the vaccine was given in the left thigh with the onset of the paralysis in the right leg only about 8 days after the first dose, both he and Dr. Leake did not believe that the vaccine was responsible.

It is of course difficult to interpret accurately the etiology of these 10 cases of poliomyelitis occurring among over 10,725 immunized individuals, 90.8 per cent of whom were under 15 years of age, since it is impossible to prove definitely or disprove that they were caused by the vaccine. If due to the vaccine, it is difficult to understand why there were not more cases since the particular lots administered had been given to at least 2,544 individuals, the majority of whom were children in the ages of greatest susceptibility. None of the vaccines were prepared of individual monkey spinal cords but were mixtures of four or more.

Furthermore, the duration of the period of incubation of poliomyelitis in human beings cannot be definitely stated, as one never knows when infection is contracted from a carrier or an abortive case of the disease. Indeed one of its greatest mysteries is the frequency with which isolated cases develop without any possible way of knowing or ascertaining the source of infection. It is commonly stated, however, that the period of incubation is from 1 to several weeks. Six of these 10 cases (Nos. 1, 2, 3, 8, 9, and 10) developed poliomyelitis 8 days or less after the first dose of vaccine, while the others (Nos. 4, 5, 6, and 7) did so in from 3 to 6 days after the second. Under the circumstances I believe it is a reasonable assumption that some at least were in the incubation period of the disease when the vaccine was given and especially since 8 occurred in areas where possible infection with the virus was increased.

It may be stated that the vaccine produced these attacks in individuals of unusually low resistance. I know of no way of proving or disproving such an assumption. Excluding the first case, in an adult where the vaccine could not possibly be regarded as the cause, 2 occurred in children 4 years or younger (Nos. 6 and 10), and the remaining 7 in children from 5 to 10 years of age where resistance is usually higher, since a larger percentage of this age group are known to carry neutralizing antibody in the blood.

It might also be assumed that the vaccine is capable of producing a negative phase of temporarily lowered resistance in some individuals, as is believed may follow the administration of any vaccine. I have not been able to elicit any evidence of this in the experimental disease of monkeys, although it may possibly occur in some human beings despite the fact that the doses are small. If such occurred, however, in unusually susceptible children receiving the vaccine during the incubation period of poliomyelitis, it may

readily result in a severer type of the disease, and this may have occurred in Cases 4, 5, 6, 7, and 9. On the other hand, if Case 3 was in the early stage of poliomyelitis when the vaccine was given, there were certainly no evidences of a negative phase having been produced since the attack was so mild.

However, I am now particularly interested in the intracutaneous injection of the vaccine because preliminary results indicate that much smaller doses may give an equally good or even better immunity response than subcutaneous injection, with possibly much less chance of producing periods of temporarily lowered resistance. And in this connection the recently published work of Rivers and Ward[9] upon intracutaneous injections of culture vaccine virus for immunization against smallpox has renewed our interest in the possibilities of the intradermal use of poliomyelitis vaccine.

Furthermore, the intracutaneous injection of the vaccine may greatly reduce the chances of the virus in the vaccine being conducted to the spinal cord by way of the peripheral nerves or lymphatics, although it does not appear from the 10 cases herein reported that this is at all likely to occur from subcutaneous injections. In Cases 3 and 4, for example, the vaccine was injected in the left arms but mild paralysis developed in the right arms; in case 10 the vaccine was given in the left thigh with paralysis developing in the right leg; while in Cases 1, 6, and 8, paralysis also developed in the legs although the vaccine was given in the arms.

I do not wish to be understood as merely seeking reasons for excusing the vaccine as a possible cause of these 10 cases of poliomyelitis occurring among 10,725 and more inoculated persons; but if the vaccine were primarily responsible, I find it difficult to understand why there were not many more cases among the 2,544 inoculated with the same lots and particularly since 30 per cent of the whole, or 3,307, were children under 4 years of age and therefore in the period of greatest susceptibility. Furthermore, it is not without significance that no one receiving the full 3 doses has contracted the disease. Under the circumstances, I do not personally believe that the vaccine was responsible for all of these cases although I think it is possible that its administration to unusually susceptible children during the incubation period may enhance the severity of the disease by the production of a negative phase, and especially during epidemics when the virulence of human virus is probably increased.

IMMUNIZING VALUE

It is of course too early to express a definite opinion of the immunizing value of the vaccine except to mention again that no one receiving the full 3 doses has contracted poliomyelitis. Only the lapse of many years will eventually reveal whether or not any immunized individuals develop the disease. In this connection I very carefully considered the manner of distributing the vaccine for the purpose of securing the best possible check-up and adequate controls, and finally decided that since we were financially unable to establish social service departments for follow-up work, this could be best handled through individual physicians keeping the addresses of immunized persons and using the much larger group of unvaccinated individuals in each community as controls. After all, and in the final analysis, it is essentially a matter for determining whether or not any vaccinated persons, especially children, develop the disease during the present epidemic or in the future, and this demands the immunization of as many as possible with subsequent observations over years, which I finally

decided could be best done through individual physicians.

It is true that additional data of some scientific value may be obtained by conducting monkey serum neutralization tests before and after immunization to determine the number responding with the production of neutralizing antibody. Unfortunately, since our work was financed and made possible only by voluntary contributions from physicians, we were not able to conduct as many of these tests as we had hoped. It would appear, however, that enough may have been conducted to indicate that neutralizing antibody is produced in over 80 per cent of vaccinated individuals, but it remains to be seen whether or not this is adequate for effectual resistance to the disease. I have reason to believe [1] that the antibody produced in human beings by active remote monkey passage virus is capable of neutralizing human virus, and under the circumstances I believe one can reasonably assume and expect that it will afford a state of resistance to infection. Furthermore, since there is apparently in poliomyelitis an important tissue immunity,[1] it is not unlikely that the vaccine may produce a type of immunity not to be measured or ascertained by monkey serum neutralization tests. This is conjectural only, and awaits final elucidation by the passing of years, with follow-up observations on a very large group of vaccinated individuals and particularly young children.

I am confident that the vaccine prepared exactly as described so as to contain at least some active virus is capable of immunizing monkeys and the production of the immune state in these animals was always determined by injecting them intracerebrally with 5 or more minimal infective doses of virus. Unfortunately we were unable to finance neutralization tests with the sera of these monkeys before and after immunization, so that I am unable to discuss the relation or lack of relation of neutralizing antibody to resistance in these animals; but, after all, the results of intracerebral tests would appear to be the better criterion when controlled by the intracerebral inoculation of an adequate number of unvaccinated animals, as we were fortunately able to do.

From the fact that the vaccine is capable of successfully and effectively immunizing monkeys, and since it has produced neutralizing antibody in children capable of neutralizing human virus in about the third monkey transfer, I am reasonably confident that the vaccine is capable of effectively immunizing human beings against the disease.

It is, however, still too early to express an opinion on the probable duration of this induced immunity except to state that 3 monkeys have maintained a solid immunity for 3 years. I have now discarded the animals, because their age may alone account for at least a part of this resistant state to intracerebral inoculations with virus, and for this reason further tests would appear to have but little scientific value. It is not without significance and encouragement, however, that monkey neutralization tests with the sera of 23 out of the original group of 25 children [5] immunized 11 months previously, have shown the persistence of antibody in all who showed its presence when tested 1 week after the third dose. Indeed, one child without demonstrable amounts of antibody in tests conducted at that time showed its presence in these repeat tests conducted this year. I believe therefore that the immunity produced by the vaccine is an enduring one, and if it lasts only a sufficient number of years to protect children over their age of greatest

susceptibility until the natural immunity of maturity has been reached, it seems well worth while.

SUMMARY

1. It would appear that effective vaccination against acute anterior poliomyelitis requires the administration of active virus.

2. Treatment of remote monkey passage virus with sodium ricinoleate and phenylmercuri-nitrate by the method described has resulted in sufficient attenuation to render the vaccine safe for the vaccination of monkeys.

3. The injection of such vaccine subcutaneously also appears to be an important additional factor of safety.

4. It is suggested that the remote monkey passage virus employed in the preparation of the vaccine may have lost some infectivity for human beings by the subcutaneous route of administration.

5. The amounts of vaccine employed for the immunization of human beings has been less per body weight than used for the immunization of monkeys because it is believed that less immunity will be required for adequate protection against natural infection with human virus.

6. The vaccine has been employed in the immunization of 10,725 individuals mostly in epidemic areas. Of these 3,307 (30.8 per cent) were under 4 years of age; 6,425 (60 per cent) between 5 and 15 years; and 993 (9.2 per cent) over 15 years.

7. With sterile vaccine local reactions at the sites of inoculation occurred in about 9 per cent with constitutional reactions in from 1 to 2 per cent.

8. There is no evidence of the vaccine having produced lymphocytic chorio-meningitis or demyelinization encephalo-meningitis.

9. No individual who received the full 3 doses has developed poliomyelitis. Among the 10,725 inoculated individuals there were 10 cases of poliomyelitis following 1 or 2 doses. Two were 4 years old or younger; 7 were between 5 and 10 years; and 1 was an adult. The same lots administered to these individuals were given to 2,544 additional persons (mostly children) without ill effects. An analysis of these cases indicates that some were probably in the incubation period of the disease when the vaccine produced a temporary period of lowered resistance or a " negative phase."

10. It is believed that the vaccine is probably safe for the immunization of human beings and especially when given during non-epidemic periods.

11. It is too early to express an opinion of the practical immunizing value of the vaccine, as a large group of vaccinated children must first be observed over a period of years. The results of immunization of monkeys and serum neutralization tests of children for antibody indicate, however, that effective immunization is possible.

12. The duration of the immunity cannot be given at present except to state that it has endured in monkeys up to at least 3 years, and antibody has persisted in children for at least 11 months. If, however, the immunity is found to protect children over their age of greatest susceptibility, it would appear that vaccination may be well worth while.

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Immunity in Virus Diseases With Particular Reference to Poliomyelitis*

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INFECTIOUS diseases are caused by protozoa, fungi, spirochetes, bacteria, Rickettsia, and viruses. At this time, however, we shall limit our remarks to certain phenomena associated with the diseases caused by the viruses or filterable viruses.

It is very difficult to define the term viruses. Nevertheless, the word has a very definite meaning to those actively working with them. Probably the best way to convey to you what is meant by these active agents is to enumerate some of the diseases incited by them, for example, bacteriophagy, mosaic diseases of plants, polyhedral diseases of insects, certain filterable tumors of fowls and rabbits, fowl-pox, fowl plague, foot-and-mouth disease of cattle, equine encephalomyelitis, psittacosis, rabies, measles, smallpox, vaccinia, varicella, fever blisters, St. Louis type of encephalitis, warts, poliomyelitis, yellow fever, etc.

From what has been said it is obvious that viruses cause a large number of devastating maladies. These incitants of disease are much smaller than ordinary bacteria, are invisible in the unstained state by means of ordinary light, and are obligate parasites in the sense that they have not been cultivated in the absence of living susceptible host cells. Their exact nature has not been determined. In fact, the viruses were first shown to exist and are still principally recognized clinically and experimentally by means of their activity in a host.

As public health officers and physicians, you are undoubtedly interested in measures directed toward the control, prevention, or eradication of the diseases caused by viruses. Quarantine measures are of little or no value in controlling measles, poliomyelitis, encephalitis, varicella, etc. The most successful known method for controlling certain virus maladies is by vaccines prepared and administered in the proper manner—for example, vaccination against smallpox, yellow fever, rabies, canine distemper, etc. In order to appreciate the difficulties encountered in developing an efficacious vaccine against a virus disease, one must have some understanding of the immunological phenomena observed in the virus field. It is with some of these phenomena that I shall deal before specifically discussing prophylaxis against poliomyelitis.

It has been shown that agglutinins, precipitins, complement-fixing antibodies, and neutralizing or protective antibodies may appear in the sera of

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individuals who have recovered from certain virus diseases. Moreover, an obvious infection with a virus usually leads to a state of increased resistance in the recovered host to further molestation by the same agent. It is of no particular interest, however, that such things take place in virus diseases, because they are known to occur in other types of infection. Nevertheless, there are some facts of particular interest which deserve consideration at this time:

1. Why is it so difficult to obtain an efficient immunity against virus infections by means of injections of vaccines composed of inactivated viruses?
2. Are the agglutinins, precipitins, complement-fixing antibodies, and protective antibodies the result of the stimulation of a host by means of a single antigen?
3. In what manner do the neutralizing or protecting antibodies act?
4. Why do so many virus diseases lead to a permanent immunity in recovered hosts?

Questions arising in regard to the immunization of individuals with inactive viruses are difficult to answer, because it is almost impossible at present to determine when a virus has been completely inactivated. For example, Lippert doubts whether Perdrau and Todd, by means of methylene blue and light, completely inactivated the canine distemper virus which later was shown to immunize dogs against distemper. Furthermore, Dunkin and Laidlaw have shown that formolized canine distemper virus will produce a fleeting immunity in vaccinated dogs, but in order to get a solid lasting resistance active virus must be employed. In the literature, statements are found that inactive viruses can act as efficacious vaccines, and canine distemper and yellow fever are cited as examples of diseases that can be prevented in this manner. Such statements are incorrect because field experiments with these two diseases offer no evidence that vaccines of inactive virus will prevent epidemics of them.

Certain workers are of the opinion that the amount of inactive virus is the all important factor, *i.e.*, if a sufficient amount were used, a solid immunity would result. Mackenzie reported that with small doses of inactive Rift Valley fever virus he was unable to immunize mice, while with large doses, 1 c.c. administered intraperitoneally, he was able to establish a good resistance in the animals to the active agent. Assuming that the virus was completely inactivated and that the mice were solidly protected, one must remember that a mouse weighs in the neighborhood of 20 gm. and that 1 c.c. or 1 gm. of the virus emulsion was administered, *i.e.*, approximately 1/20 of the body weight. On the basis of these figures a man weighing 150 lb. would require 7½ lb. of vaccine—not a very practical procedure.

When one brings up the question of the production of immunity by an inactive virus, antirabic vaccination is cited as an example of protection induced in this manner. I am glad to find, however, that some workers are no longer willing to accept dogmatic statements handed down to them in regard to antirabic vaccination, but insist upon exploring the field for themselves. As a result of this healthy skepticism it is being found that many batches of the Semple phenol-killed antirabic vaccine on the market will not immunize animals even when repeated large doses are employed. Nor is it surprising to find that the practice of giving dogs one dose of this material is frequently attended by the failure of the animals to be protected against rabies subsequently acquired through the bites of rabid animals.

Whatever viruses may be, in the active state they are antigens, and as such one would like to think of them

as containing proteins, or at least as being linked in some way to proteins. Therefore, if sufficient amounts of these agents in an inactive state, yet with their antigenic components not altered by inactivation, were administered to subjects in the form of vaccines, I would not be surprised to find complement-fixing antibodies, etc., appearing in the sera of vaccinated individuals; nor would I be disturbed to find that a certain amount of resistance to infection had resulted. In the past, however, it has not been possible to obtain viruses in sufficient amounts in a relatively pure state to determine what happens to their antigenic components when inactivated. Recently, Craigie has opened up this field in regard to vaccinia and has found that vaccine virus is composed of several antigens some of which are extremely labile and appear to function in the production of resistance, while others are stable and induce the formation of agglutinins, etc. Parker, working in my laboratory, has confirmed many of Craigie's findings. What Craigie has accomplished for vaccinia must be done with other virus maladies, and, in the meantime, generalizations should be suspended.

For the sake of argument let us assume that it has been demonstrated that a certain degree of immunity can be obtained by a completely inactive virus provided sufficient amounts are administered. What about the duration of the protection induced in this manner? All the evidence at hand seems to indicate that whatever protection is produced in this way endures only for a relatively short time. Even this fact is admitted in regard to the antirabic vaccination of dogs, the yearly repetition of which is advised. Furthermore, the Pasteur treatment is repeated each time a human being is bitten by a rabid animal. Strange to say, many workers do not seem to be disturbed by this fact. In the case of hogs and cattle that are raised for the meat market and will live for a short time only it is not necessary to produce a lasting immunity. Nevertheless, the duration of an immunity produced by vaccines, particularly when the vaccines are expensive to make and difficult to administer, is of great importance in the protection of human beings against smallpox, yellow fever, measles, poliomyelitis, etc.

As a rule, the serum from a host recovered from a virus disease possesses neutralizing or protective properties. For instance, an appropriate amount of convalescent serum mixed with the homologous virus results in what is called a neutral mixture, *i.e.*, the mixture of virus and convalescent serum does not produce evidences of disease in a susceptible host. Furthermore, in many instances, sufficient convalescent serum injected into a susceptible host prevents the production of disease by the homologous virus inoculated just prior to or within a short time after the administration of the serum. The latter fact is the basis for the use of convalescent or immune serum in the prophylaxis against virus maladies, including poliomyelitis. However, the results with poliomyelitis are not as striking as are those obtained with measles, and the passive protection thus developed in monkeys against poliomyelitis endures only for a few days.

The manner in which the neutralizing or protective antibodies act is not known. In spite of this fact, most workers are agreed that the viruses in the so-called neutral mixtures which are usually injected into animals shortly after preparation are not really dead or inactive.

Viruses seem to multiply inside of cells, and it has been repeatedly shown that, once the viruses have come in contact with susceptible cells or have entered them, the protective or neu-

tralizing properties of convalescent or immune serum have no power of preventing injury or death of the parasitized cells. Furthermore, it has been shown that cells may be infected several days before any evidences of such infection are obvious. Usually, by the time an infected host begins to show signs and symptoms of a virus illness, all the cells that are going to be involved during that attack have already been entered by the infecting agent. Consequently, in virus maladies serum therapy given after the onset of signs and symptoms of illness is of little or no value. There is ample experimental and clinical evidence that such is the case, and poliomyelitis seems to be no exception to the rule.

It is a well recognized fact that recovery from a virus infection is usually followed by an enduring immunity. In many instances the immunity is operative during the remainder of an individual's life. Of course there are exceptions to the rule. For example, common colds recur repeatedly in the same individual, and herpes simplex or fever blisters occur at frequent intervals in the same subjects. The persistence of immunity in hosts recovered from virus diseases is so striking that it is not surprising that an explanation of the phenomenon has been sought. Furthermore, if it is the rule to encounter a lasting immunity in virus diseases, one would like to know the reason for the exceptions.

In the case of poliomyelitis and measles, the viruses of which one encounters from time to time throughout life, one might explain the persistent immunity and the presence of neutralizing antibodies on the basis of repeated contacts with the active agents. On the other hand, it is impossible to explain in such a manner the enduring immunity to yellow fever, which is accompanied by the presence of humoral antibodies, in individuals who have been out of yellow fever zones for periods of 25 to 50 years.

In view of the facts mentioned above, and because it is known that a refractory state to some bacterial and spirochetal diseases is associated with a persistence of these agents in the hosts, it has been suggested by a number of workers that at least in certain instances the protracted immunity following virus diseases is due to a prolonged or a persistent sojourn of the viruses in hosts once infected. This persistence of the viruses does not indicate that the hosts are capable of spreading disease.

Without enumerating them, I can state that sufficient instances in which viruses have been recovered from immune hosts have been recorded to show that it is not an unusual occurrence. Nor is it unlikely that, in certain instances, there is a causal relation between the persistence of the virus and the enduring immunity of the host. Moreover, it must be remembered that failure to recover a virus from an immune host is not necessarily positive evidence that it is not present.

In what way is it possible for viruses to persist in an immune host? It is most likely that these agents are intracellular parasites, and as long as they remain situated within living cells are in no danger of being eliminated from the body. If they do not kill the host cells, they can multiply and pass into daughter host cells. In this manner it is possible for them to remain indefinitely in an immune host. Such is undoubtedly what happens in the case of the Rous tumor.

At this point it is well to speak of the apparent lack of a lasting immunity to fever blisters. This disease is particularly interesting because the individuals who have recurring attacks possess an abundance of neutralizing antibodies in their sera. The paradox has been explained on the basis of the

persistence of the virus in the cells of immune individuals, who develop crops of blisters whenever subjected to the conditions that are encountered as the result of typhoid vaccination, common colds, and exposures to high temperatures for several hours, etc.

Why does one fail to develop a permanent immunity to common colds? I do not know. It is interesting to speculate, however. The cold virus may be unable to establish itself permanently in the host; it may act in a manner similar to that of fever blister virus; or the superficial nature of the infection caused by it may have something to do with the poor development of immunity.

Experience showed that recovery from most virus diseases results in an enduring immunity. Later it was found that the sera of individuals recovered from certain of these maladies possess neutralizing or protective antibodies. Consequently, a number of workers think that the presence of neutralizing antibodies in the serum of a person always indicates that the individual is immune. This is probably true when the antibodies are the result of a natural infection. In other words, the individual is known to be immune not because of the antibodies, but because of recovery from a natural infection as indicated by the presence of antibodies.

The state of affairs may be different when a host is artificially immunized against certain virus maladies. Why? —I do not know. In any event, in vaccinated individuals resistance to infection does not necessarily parallel the presence of neutralizing antibodies, as has been demonstrated in dogs vaccinated against rabies. That is, vaccinated dogs may possess neutralizing antibodies and still be susceptible to rabic virus. Parker and I have found a similar state of affairs in rabbits that had received repeated injections of formolized elementary bodies of vaccinia; some of the animals had neutralizing antibodies for vaccine virus without being resistant to a vaccinal infection. Furthermore, Hudson, Schultz, and Olitsky have shown that monkeys vaccinated against poliomyelitis may be susceptible to infection in spite of the presence of neutralizing antibodies in their sera. It is evident that the above observations are of significance when one attempts to evaluate the work of Brodie and Kolmer who lay a great deal of stress upon the fact that monkeys and human beings vaccinated according to their methods against poliomyelitis develop or increase the amount of antibodies in their sera.

In the light of the general remarks regarding the immunological phenomena observed in the virus field, the following specific statements about poliomyelitis and the vaccines prepared by Brodie and Kolmer will be more intelligible.

There is one fact that must be held in mind. It is that the virus of poliomyelitis, either active or inactive, acts as though it was a poor antigen. Even large amounts of it in the active state administered intracutaneously or subcutaneously do not regularly produce resistance to infection in monkeys. Furthermore, intracerebral doses of active poliomyelitis virus, too small to induce an obvious infection in monkeys, will not immunize the animals. Thus it does not follow that the introduction of active virus into monkeys and human beings will result in their effective immunization against infection. This fact is well illustrated by the findings of Schultz and Olitsky who repeated Kolmer's work on monkeys and were unable to demonstrate as much protection as that reported by Kolmer for his animals.

The amount of antigen in the form of active poliomyelitis virus is a very important item in attempts to immunize monkeys by way of the intracutaneous

or subcutaneous route. Even large amounts are not always effective, and investigators working in the effective range have invariably found that an occasional monkey becomes paralyzed as a result of the immunizing doses, and, for this reason, have considered it inadvisable to use active virus for the vaccination of human beings.

In view of what has just been said, the fact that there is, so far as I know, no comparable number of unvaccinated children, properly chosen in regard to location and age, to act as controls for the efficacy of the vaccine in the individuals receiving it, leaves us with a lack of definite information regarding the value of Kolmer's vaccine in the prevention of poliomyelitis in human beings.

Kolmer bases his claim for the safety of his vaccine upon the fact that it is prepared from remote monkey passage poliomyelitis virus that has been further attenuated by contact with glycerol, sodium ricinoleate, and phenylmercuric-nitrate. A statement that monkey passage poliomyelitis virus is less infectious for man than is the natural or human virus is an assumption without experimental evidence to substantiate it. Investigators familiar with work in the virus field would not put too much dependence on such an assumption. It is true that the passage of some viruses through unnatural hosts decreases their virulence for the natural ones. However, this is by no means a regular occurrence.

Many workers state that single applications of certain chemical agents attenuate viruses. This is true if they mean by such a statement that some of the virus units are completely inactivated while others are uninfluenced. In other words, it is usually a misconception to think of this kind of attenuation of viruses as a decrease in the virulence of each virus unit instead of a decrease in the number of active unaltered ones. The evidence is that when a virus emulsion has been treated with a chemical agent and is still capable of causing disease, even though the incubation period is greatly prolonged, the virus recovered from the sick animal is fully virulent. Thus it appears that attenuation by a single application of chemicals is as a rule equivalent to dilution. Dilution alone is the principle employed in the Högyes and Harris methods of vaccination against rabies. In reality, it is the principle operative in the drying of the cords for the old Pasteur method of vaccination. Consequently, it is unlikely that the virulence of each unit of poliomyelitis virus in Kolmer's vaccine is altered by the chemicals used. Therefore, just as good results probably could be obtained by dilution of the virus emulsions as by treatment of them with chemical agents. In fact, it might be better to use diluted material, because then it would be unnecessary to administer a large quantity of useless but troublesome brain substance.

Kolmer admits that at least 10 cases of paralysis have occurred after 1 or 2 doses of the vaccine, and assumes that they were not caused by its administration but by a natural infection acquired through exposure. In support of this assumption, he considers to be of significance the fact that paralyses have occurred after the first or second dose of vaccine instead of the third. Many workers would agree with him that the fact is significant, but would not agree with him in regard to his interpretation of the significance.

It must be remembered that the vast majority of children vaccinated would never have contracted poliomyelitis even though they had not received the vaccine. For unknown reasons, most children are much more resistant to poliomyelitis than are the remaining few. It is possible that the resistant

children were able to stand 3 doses of vaccine, while the most susceptible, the ones highly in need of protection, could not resist the active virus in the vaccine and same down promptly with poliomyelitis after 1 or 2 doses. I do not contend that this is the correct interpretation of the state of affairs, but it is just as plausible, if not more so, than the one offered by Kolmer, *viz.*, that the children were paralyzed by virus acquired through natural exposure instead of by the active virus in the vaccine. Therefore, in view of certain pertinent facts regarding the cases of paralysis following his vaccine it is essential for Kolmer to show definitely that it is safe.

Brodie has chosen to use what he says is inactive poliomyelitis virus for the vaccination of monkeys and children. Others employed such a virus for the immunization of monkeys many years before Brodie, and found the results so discouraging that the matter was not pursued in man.

All of Brodie's favorable results depend on his ability to titrate regularly and accurately 1 minimum completely paralyzing dose of virus. If this cannot be done, then all of his reported findings are invalid. So far as I know, no one has been able to obtain titration results similar to Brodie's, and this is not due to a lack of efforts to do so. Furthermore, Schultz and Olitsky have attempted to immunize monkeys with a vaccine prepared according to Brodie's method and have been able to find little, if any, protection in them against infection.

Recently, I had the opportunity of discussing the matter with Brodie and came to the conclusion that no case of poliomyelitis can as yet be ascribed to the use of his vaccine. Nor could I find any evidence for or against the efficacy of his vaccine. If I were asked for a prophecy, I would say: If Brodie does not make the time of inactivation of the virus too short, and if he continues to administer the vaccine in the manner now employed, it will be reasonably safe but ineffective, particularly if one expects an appreciable degree of protection to persist for any great length of time.

I trust that I have not burdened or bored you with details of immunological phenomena in the virus field. My remarks were made with the intention of showing that there is no reason at present to believe that the general principles of immunity, many of which are not known or understood, fail to operate in this field, and that most of the immunological and serological oddities encountered in this domain can be accounted for by the intimate type of parasitism exhibited by the viruses or by the multiplicity and lability of antigens involved. Finally, it was necessary to present many of the details in order to emphasize sufficiently the fact that it may be difficult, but I hope not impossible, to devise satisfactory vaccines for the prevention of certain virus maladies.

DISCUSSION OF POLIOMYELITIS PAPERS

HENRY F. VAUGHAN, DR.P.H., F.A.P.H.A.
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FROM the viewpoint of the public health administrator I assure you that it it is very essential that we have some definite advice as to what procedures we should follow in our endeavor to control poliomyelitis, and we would like to know whether we have reached the stage where there is a vaccine which is reasonably effective and at the same time safe.

Dr. Kolmer brought out the fact that there had been reported several cases of illness suggestive of poliomyelitis following the administration of 1 or 2 doses of his vaccine but in no case had clinical poliomyelitis been reported in a child who had received 3 full doses of the vaccine. He reports 10 cases which have been officially diagnosed as poliomyelitis following the use of the vaccine, 5 of which died, and also he states that 8 of these cases occurred in localities where poliomyelitis was epidemic, and among these he included the cases in New Jersey.

The official records of the Newark Health Department indicate that prior to September 20, 1935, there had been reported 21 cases of poliomyelitis, 1 in June, 1 in July, 5 in August, and 14 in September. The June case died as did 2 of the September cases. This incidence of poliomyelitis prior to September 20 is approximately the normal expectancy for 1935 based upon previous experience in this community.

In Dr. Kolmer's report he cites 1 case having occurred in July in Newark following the administration of the vaccine and as but 1 was officially reported to the health department, I am led to the inevitable conclusion that this is the case to which Dr. Kolmer referred. It would not appear that poliomyelitis was epidemic in Newark at the time the case occurred.

There were also reported in Dr. Kolmer's series 2 cases which developed following the administration of vaccine in Plainfield, N. J. One child received his initial dose of vaccine on August 24, his second dose on August 31, was taken ill on September 4, admitted to the hospital on the 5th, and died the following day. The second child received his first dose of vaccine early in August, his second August 31, and developed symptoms of poliomyelitis on September 6, was hospitalized and died on September 9. These are the official records which I have obtained from the Health Department at Plainfield. I have also been informed that during the first 19 days of September there were but 5 cases and 2 deaths from poliomyelitis officially reported to the Health Department of Plainfield, and I would assume that the 2 cases to which Dr. Kolmer referred, both of which terminated in death, must have been included in the series. Again, it would not appear that poliomyelitis was epidemic in this community at that time.

Dr. Kolmer further stated that he had included in his series all instances where children had contracted a disease suspicious of poliomyelitis following the giving of his vaccine, but I fail to find any reference to a case which was officially reported in Detroit in the month of August. It is true that this Detroit case has been explained

by the attending physician on the basis of previous exposure, but if Dr. Kolmer is to include in his series all cases which are to be explained on this basis, he should, I believe, include the Detroit case.

The official records in the possession of the Detroit Health Department indicate that a 10 year old boy was seen by a local physician on August 10, complaining of fever, headache, and a sore neck of 3 days' duration. This case was diagnosed as tonsillitis. The child, however, had been attending a boys' camp and one of his tent-mates had been reported as having poliomyelitis. Accordingly, the attending physician administered the first dose of Dr. Kolmer's vaccine on August 10, and our records indicate that the second dose was administered on August 17, and the child admitted to the Herman Kiefer Hospital on August 21, where he remained for nearly 3 weeks, and where the case was considered as a non-paralytic form of poliomyelitis. The child recovered.

I wish to reëmphasize the fact that from the epidemiologic evidence at hand it does not appear reasonable to explain all cases of poliomyelitis following vaccine as due to previous exposure. I would wish to have far more detailed information concerning the life case history of each. Also, I do not personally believe that the public health administrator is justified in using this vaccine as a part of his poliomyelitis control procedure; in fact, with the evidence at hand, it would be most inadvisable for the health officer to use this vaccine.

C. H. HALLIDAY, M.D.

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I AM thoroughly convinced that there are several types of this disease and that mild or variant forms exist in which there is no detectable evidence of meningitis or myelitic involvement, and that there is very little uniformity of opinion with regard to their diagnostic criteria. The perfectly frank cases may be considered those cases which develop paralysis in association with the usual signs of the disease. My own concept of the disease has been drawn from the observations of 1,274 cases in one epidemic and several lesser epidemics. Of the 1,274 cases, 812 were definitely paralyzed, and in 118 of the 812, the spinal fluid showed a varying degree of cellular increase ranging from 8 to 8,000. Two hundred and five of the cases were classified as abortive; the limits of the clinical picture of this type is uncertain, but in my observations it consisted of an acute febrile disease, the temperature lasting from 12 to 72 hours, vomiting, sore throat, pain and tenderness, slight stiffness of the neck or back, and the patient left feeling below par for several days. In this group the statement was frequently made by the mother that all the children in the family had been ill and one eventually developed paralysis. Two hundred fifty-seven of the cases were classified as "type unknown," falling into the class suggested by Frost: "those in which the clinical symptoms were so indefinite as to furnish no basis for a differentiation from various common infections, but on account of intimate association with a definite case, the diagnosis was suggestive."

I believe the abortive type to be very

common, manifested especially during epidemics by such minor symptoms as fever, headache, and vomiting. It is this type which is frequently referred to as "summer influenza," "summer grippe," acute tonsillitis or gastroenteritis. From my limited knowledge of the 1935 epidemic in Virginia, I am inclined to believe that had only frankly paralyzed cases been accepted, the number reported would have been far less.

It appears to me that the disease occurs in different severity in different epidemics, one epidemic showing a majority of paralytic cases and another in the same locality being characterized by the non-paralytic or sub-clinical type. I believe Dr. Leak's observation will bear this out.

In one epidemic where the opportunity existed to make a post-clinical study of abortive cases, it was found that reflexes were diminished or absent and definite muscle weakness established in one or more groups of muscles, and in a few instances where a biopsy was obtained, it was demonstrated by microscopical examination that there actually existed degeneration of muscle fiber in which no gross disturbances of function was demonstrable.

As to vaccines for the prevention of this disease, I believe the scientific research should continue, but their use should be limited to a few selected persons, so that methods may be uniform and results carefully studied.

JOHN F. KESSEL, M.D.

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THE first papers of this symposium, giving the experience of the workers in the recent epidemic of poliomyelitis in North Carolina and Virginia, have presented material which indicates that we in California are not the only individuals who experience the unusual. It would appear from their reports that the recent epidemic through which they have passed has many parallels, particularly with reference to the spinal fluid picture, the low mortality and low residual paralysis rate with our experience in the epidemic of 1934 and 1935 in Southern California.

We have often had the question raised as to whether we were actually dealing with typical poliomyelitis, and in attempting to answer have proceeded with caution. The experiences recorded today encourage us in the opinion that we were dealing with poliomyelitis in Southern California, though in a somewhat atypical form.

One aspect of special interest in our epidemic was the high communicability rate as illustrated by the large number of doctors, nurses, and other hospital employees who become infected. In 1934 some 200 of our employees developed poliomyelitis, and during the summer of 1935 approximately an additional 50 developed the disease.

The fact that most of those coming down in 1935 were individuals who were not working in the hospital during the 1934 epidemic, and therefore had developed no immunity, brought us face to face with the question as to whether or not in our institution we should use the vaccines being reported as having merit. Our hospital poliomyelitis committee sent representatives

TABLE I

SHOWING INDIVIDUALS RECEIVING POLIOMYELITIS VACCINE
JUNE TO OCTOBER, 1935

	Brodie's Vaccine	*Kolmer's Vaccine*
Nurses—(entering before October, 1934)	41	36
(entering between October, 1934 and June, 1935)	44	26
(entering October, 1935)	68	0
Doctors	48	13
Technicians	14	0
Orderlies	8	10
Retention Homes	108	0
Total	331	85
Grand Total 416		

to the Bakersfield area where some 2,000 cases had been vaccinated with the Brodie vaccine with no untoward results. After careful consideration the committee decided that it would be unfair to withhold the vaccine, which might possess merit, in such an emergency, and accordingly made arrangements with Dr. Brodie and Dr. Kolmer, both of whom transmitted definite statements to the hospital authorities declaring their belief in the safety of their products, to give their vaccines to volunteers who would sign a statement recognizing the fact that they were in their experimental stage and thereby assuming responsibility. Minors who took the vaccines were required to have their parents sign the records. In all, 416 received the vaccines, as indicated by Table I:

It will be observed that the Brodie vaccine was given to a greater number than was the Kolmer, the reason being that certain members of the committee considered that a vaccine made from living virus might possess potential dangers, and therefore it was considered safer to discontinue its use, since we preferred to allow groups other than ours to experiment with this type of vaccine.

The table shows the distribution of the vaccinated individuals among the employee groups to which they belonged. It is difficult to keep adequate parallel controls in a series of vaccinated individuals of this type and it has been found impossible to do so with each group individually.

There is one group of nurses, however, which has yielded rather interesting results. This is made up of student nurses and affiliate student nurses who came to work in the Los Angeles County Hospital following the peak of the 1934 epidemic. Altogether, since October 4, 1934, to June 1, 1935, 189 came to work in the hospital. Of these, 45 had developed poliomyelitis by June 15, the date that our vaccinations began, leaving 144 who were well at that time. Of the 144, 70 received vaccine, either Brodie's or Kolmer's, and 74 were not vaccinated. Of the vaccinated, 2 developed poliomyelitis within 3 or 4 days after the administration of the vaccine, 1 from the Brodie series and 1 from the Kolmer series. Of the unvaccinated, 1 developed poliomyelitis within this time. These 3 cases should be ruled out since they undoubtedly were in the incubation stage at the time the experiment began. Of the remainder, none developed poliomyelitis among the vaccinated, while 3 came down during July among the unvaccinated.

The results may be reduced to include only nurses who came to work after February 1, 1935, leaving out from the series those who began to

work in October, 1934. These results may be tabulated as follows:

			Developed Poliomyelitis
Received vaccine	Brodie's	27	None
	Kolmer's	15	
		42	
Received no vaccine		50	3

From these few cases it is seen that 6 per cent of the unvaccinated subsequently developed poliomyelitis, but none of the vaccinated. These data are few in number and I hesitate to attach great significance to them. However, since no untoward results have developed, it would appear, in so far as our records are concerned, that its use is not contraindicated.

Of interest is the type of reaction following vaccination. Local reactions were, as a rule, moderate and no abscesses developed at the site of injection. There were, however, a number of severe constitutional reactions, 9 among those receiving the Brodie vaccine and 5 among those receiving the Kolmer vaccine. In each instance there was a marked soreness at the point of injection and about 4 hours after the injection a generalized reaction with chills and fever developed, which lasted from 6 to 10 hours and then subsided. Soreness was marked in these cases and lasted for 24 hours.

MAURICE BRODIE, M.D., F.A.P.H.A.

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INASMUCH as the formalized vaccine we have been using appears to be perfectly safe and inasmuch as there is nothing to contraindicate its efficiency, we feel that further controlled studies should be continued until a definite evaluation can be obtained. This can be accomplished only through a strictly controlled distribution of the virus through health officers or clinics with the proper follow up.

It is agreed by all that heat killed vaccine cannot produce immunity, but there is evidence that viruses rendered non-infective by other means may still be antigenic. Examples have been cited, and Dr. Rivers has mentioned the action of methylene blue and light on various viruses. Studies such as these indicate that the changes may be either quantitative or qualitative. For example, we have found Semple vaccine non-infective for guinea pigs and rabbits, yet it may infect the more susceptible mouse. This, and the fact that formalin treated vaccine gives an antibody response only when the formalin acts for the shortest time required to render it non-infective, suggests the possible presence of an amount of virus too small to infect. An example of a qualitative change is the action of methylene blue and light in which a virus becomes non-infective and antigenic.

One cannot always interpret human experiments in the light of results of animal experiments and so a method that produces a small degree of immunity in the monkey, which is a difficult animal to immunize, may be far more efficacious in the human. This has been suggested by the better antibody response of children to the vaccine. Moreover, no immunity is absolute and a moderate degree in children may be built up more strongly and maintained through further exposures.

DISCUSSION (*Cont.*)

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IT was not my intention to participate in this discussion, but since my name has been mentioned, I must state that I did not express a belief that the vaccine was not responsible for Case 10. In any individual case the possibility should be left open that natural infection was operative, but the meaning of the series as a whole is clear to me, and I beg you (Dr. Kolmer) to desist from the human use of this vaccine. According to my count of the onsets, 1 fatal case occurred 6 days after the second dose, another fatal case 6 days after the second dose, and 12 days after the first dose, 2 paralytic cases and 1 fatal case 8 days after the first dose, a fatal case 9 days after the first dose, another fatal case 10 days after the first dose, a paralytic case 11 days after the first dose, and another paralytic case 14 days after the first dose.

In each instance in which the site of the injection and the site of the first paralysis is known, the latter occurred either in the limb injected, or in the corresponding limb of the opposite side; in other words, the cells of the spinal cord first involved were at the same level as the injection. The anatomists tell us that the lymph streams accompanying the peripheral nerves do not enter the vertebral canal, so that there is no direct connection between the blood or lymph supply of a limb and the corresponding level of the spinal cord. These cases would therefore tend to show, what experimental work has already indicated, that the virus of poliomyelitis travels along the nerve fibers themselves.*

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* At a luncheon session of the Health Officers Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 10, 1935. Dr. Leake mentioned a fatal case occurring 14 days after the first and only dose of another vaccine, as possibly being parallel to the cases above cited. Since then 2 other paralytic cases have occurred 13 and 14 days, respectively, after administration of the same vaccine. While any one of these alone would be dubious, the periods of time between vaccination and onset, in connection with the series above cited, appears to justify discontinuance of the human use of this vaccine also.

NOTE: For details of cases mentioned, see *J.A.M.A.*, Dec. 28, 1935, p. 2152.

An Improved Method of Preparing the Kolmer Poliomyelitis Vaccine*

JOHN A. KOLMER, M.D., D.Sc., LL.D. †

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IN the preparation of poliomyelitis vaccine by the method of Kolmer[1] 8 gm. of remote monkey passage spinal cord are thoroughly emulsified aseptically in 100 c.c. of sterile saline solution. After fine-mesh filtration to remove coarse particles, there is added an equal volume of sterile 2 per cent solution of sodium ricinoleate (William S. Merrell Company) which gives a 4 per cent suspension of virus in 1 per cent sodium ricinoleate. This mixture is placed in an incubator at 37° C. for 24 hours and then in a refrigerator at 10° to 12° C. for 10 to 14 days, with daily shaking for a few minutes, when aerobic and anaerobic cultures are made and mice injected intraperitoneally as an additional test for any possible contamination with tetanus bacilli or spores. When a careful aseptic technic is employed, the great majority of the vaccines are found to be sterile.

PURPOSE OF INVESTIGATION

Since sodium ricinoleate is of low bactericidal activity, care is required against subsequent accidental bacterial contamination of the vaccine, especially during its administration. For this reason we have sought to determine if it is possible to add germicidal agents in bactericidal amounts without reducing the immunizing capacity of the vaccine, in order to prevent accidental contamination, such as has occurred in a few instances, with the production of severe local reactions at the sites of inoculation.

Since we are convinced that the immunizing value of the vaccine depends upon the presence of living attenuated virus, this has meant the possibility of finding a chemical agent capable of selectively destroying such organisms as staphylococci, streptococci, *B. coli,* and *B. subtilis,* without materially destroying the virus, since these organisms are of most importance from the standpoint of possible contamination in the preparation and administration of the vaccine.

For this purpose we have contaminated portions of sterile vaccine with these organisms and determined the approximate smallest amounts of formalin, phenol, mercurophen, merthiolate, and phenyl-mercuri-nitrate capable of sterilizing in an exposure of 24 hours at 37° C. We conducted the tests with the finished ricinoleated vaccine with an exposure of 24 hours at 37° C. in order to duplicate exactly practical working conditions in the preparation of the vaccine, as well as to include the bactericidal activity of sodium ricinoleate and the influence of the spinal

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* Read before the Laboratory Section of the American Public Health Association, at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

† With the assistance of Anna M. Rule.

cord protein in reducing the bactericidal activity of the chemical agents employed.

As soon as the bactericidal activity of the 5 chosen agents for the 4 organisms was determined, we prepared 5 ricinoleated vaccines exactly as outlined except that 1 carried the *minimum* bactericidal concentration of formalin, a second phenol, a third mercurophen, a fourth merthiolate, and a fifth phenyl-mercuri-nitrate. These 5 vaccines were employed in the immunization of monkeys to determine whether the antiseptics had caused any reduction in their vaccinogenic activity.

Another factor which has engaged our attention is the possibility of *Macacus rhesus* monkeys harboring in the central nervous system the virus of lymphocytic choriomeningitis described by Armstrong and his colleagues[2, 3, 4] and which they believe may produce a benign type of so-called "aseptic meningitis" in human beings. Fortunately, according to these investigations, it is possible to detect the virus in the brain and spinal cord of monkeys by intracerebral inoculation of mice and guinea pigs. We have included this test routinely on all monkey poliomyelitic spinal cords and brains before using the former in the preparation of vaccine. We have not encountered the virus in a single animal.

BACTERICIDAL TESTS

Tests were conducted with formalin (U. S. P.), phenol (U. S. P.), mercurophen (Sharp & Dohme), solution 45 of merthiolate 1:1,000 (Lilly Co.), and phenyl-mercuri-nitrate (Merrell Company). One hundred c.c. portions of finished sterile ricinoleated vaccine were contaminated with 1 c.c. of a 24 hour broth culture of *Staphylococcus pyogenes aureus* and 1 c.c. amounts added to 1 c.c. of dilutions of formalin 1:1,000 to 1:6,000, giving final dilutions of 1:2,000 to 1:12,000. These were thoroughly mixed and placed at 37° C. for 24 hours, when 0.5 c.c. of each was sub-cultured in 200 c.c. of nutrient broth, in order to dilute the formalin carried over well beyond its bacteriostatic threshold. These sub-cultures were incubated for 3 days when the results were recorded. At the same time duplicate tests were conducted with ricinoleated vaccine contaminated with similar amounts of 24 hour broth cultures of hemolytic streptococcus, *B. coli*, and *B. subtilis*. Phenol was used in final dilutions of 1:80 to 1:400; mercurophen and merthiolate in 1:30,000 to 1:160,000; and phenyl-mercuri-nitrate in 1:40,000 to 1:240,000 in similar tests with the 4 organisms.

The results summarized in Table I show the bactericidal activity of the 5 agents for the 4 organisms according to the technic employed. The tests were conducted 3 times, and while the results were not identical, yet those shown are, we believe, approximately correct. The streptococcus was most easily destroyed. The staphylococcus ranked next in susceptibility to all 5 agents, while the colon bacillus was more resistant than *B. subtilis*, probably because sodium ricinoleate has a peculiar bactericidal and bacteriostatic activity for this spore-bearing organism.

The mercurial compounds were most bactericidal. Phenyl-mercuri-nitrate gave the best results followed by mercurophen, merthiolate, formalin, and phenol, in the order of bactericidal activity.

PREPARATION OF VACCINES

Five ricinoleated vaccines were then prepared of monkey poliomyelitic spinal cord as previously described[1] except that the solution of sodium ricinoleate carried twice the minimal bactericidal amounts of the 5 germicides, the amounts employed being:

TABLE I

RESULTS OF BACTERICIDAL TESTS

Ricinoleated Vaccine	*Final Dilutions*	*Bactericidal Results*			
		Staph. aureus	*Hemolytic strept.*	*B. coli*	*B. subtilis*
+ Formalin	1:2,000	—*	—	—	—
	1:3,000	—	—	—	—
	1:4,000	—	—	—	—
	1:6,000	—	—	+	—
	1:8,000	+	—	+	—
	1:12,000	+	—	+	+
+ Phenol	1:80	—	—	—	—
	1:100	—	—	—	—
	1:160	—	—	—	—
	1:200	—	—	—	—
	1:320	+	—	+	—
	1:400	+	—	+	+
+ Mercurophen	1:30,000	—	—	—	—
	1:40,000	—	—	—	—
	1:60,000	—	—	—	—
	1:80,000	—	—	—	—
	1:120,000	+	—	+	—
	1:160,000	+	—	+	+
+ Merthiolate	1:30,000	—	—	—	—
	1:40,000	—	—	—	—
	1:60,000	—	—	—	—
	1:80,000	—	—	—	—
	1:120,000	+	—	+	—
	1:160,000	+	—	+	+
+ Phenyl-Mercuri-Nitrate	1:40,000	—	—	—	—
	1:60,000	—	—	—	—
	1:80,000	—	—	—	—
	1:120,000	—	—	—	—
	1:160,000	—	—	—	—
	1:240,000	+	—	+	—
Ricinoleated Vaccine	Controls (4)	+	+	+	+

* — = no growth; + = growth

formalin 1:4,000; phenol 1:100; mercurophen 1:40,000; merthiolate 1:40,000; phenyl-mercuri-nitrate 1:80,000.

RESULTS OF IMMUNIZATION OF MONKEYS

Six monkeys were used for each vaccine; 2 received 0.05 c.c. per kg. subcutaneously every 5 days for 5 doses, 2 0.25 c.c., and 2 0.5 c.c. Twelve days after the last dose each animal received an intracerebral injection of 0.5 c.c. of 5 per cent virus (about 10 minimal infective doses) as a test for acquired immunity, and all animals were kept under daily observation for 4 weeks.

Six additional monkeys were immunized with the ricinoleated vaccine alone as controls, and 4 monkeys received an intracerebral injection of the virus alone at the time the tests for immunity were conducted as controls on the infectivity of the virus. The results are summarized in Table II.

All of the 4 monkeys receiving intracerebral injections of the virus alone

TABLE II

RESULTS OF IMMUNIZATION OF MONKEYS

Vaccines	*Dose per Kg.* (c.c)*	*Results of Intracerebral Inoculation with Virus as Test for Immunity* †
Sodium Ricinol. Vaccine	0.5	Normal
	0.5	"
	0.25	"
	0.25	"
	0.05	Developed paralysis on 11th day
	0.05	" " " 14th "
Same + Formalin 1:4,000	0.5	Developed paralysis on 10th day
	0.5	" " " " "
	0.25	" " " 8th "
	0.25	" " " 7th "
	0.05	" " " 7th "
	0.05	" " " 8th "
Same + Phenol 1:100	0.5	Normal
	0.5	"
	0.25	Developed paralysis on 12th day
	0.25	" " " 14th "
	0.05	" " " 7th "
	0.05	" " " 7th "
Same + Mercurophen 1:40,000	0.5	Normal
	0.5	"
	0.25	Developed paralysis on 17th day
	0.25	" " " 20th "
	0.05	" " " 8th "
	0.05	" " " 8th "
Same + Merthiolate 1:40,000	0.5	Normal
	0.5	"
	0.25	Developed paralysis on 16th day
	0.25	" " " 20th "
	0.05	" " " 7th "
	0.05	" " " 7th "
Same + Phenyl-Mercuri-Nitrate 1:80,000	0.5	Normal
	0.5	"
	0.25	"
	0.25	Developed paralysis on 21st day
	0.05	" " " 8th "
	0.05	" " " 8th "

* Every 5 days by subcutaneous injection for 5 doses.
† 0.5 c.c. of 5 per cent virus (about 10 minimal infective doses) given 12 days after last dose of vaccine.

developed severe paralysis 7 to 8 days after inoculation.

None of the monkeys developed paralysis from any of the vaccines alone, even in doses as large as 0.5 c.c. per kg. This confirmed our previous observations that subcutaneous injections of virus treated with sodium ricinoleate has not produced poliomyelitis in monkeys, even though the strain employed has been well adapted to this animal.

The best results were observed with the regular ricinoleated vaccine without the addition of any germicide, since all of the monkeys receiving 0.25

and 0.5 c.c. per kg. for 5 doses were completely protected against the intracerebral injection of about 10 minimal infective doses of virus. Those receiving 0.05 c.c. per kg. probably had a slight degree of immunity since paralysis did not appear until 11 to 14 days after intracerebral inoculation with virus, whereas the unvaccinated controls developed paralysis on the 7th and 8th days. A monkey inoculated intracerebrally with 0.3 c.c. of the vaccine developed paralysis 10 days later, indicating that the vaccine contained living but probably slightly attenuated virus.

None of the monkeys receiving the formalized vaccine were protected. We do not know whether the virus was completely killed by the amount of formalin used, but certainly the doses of this vaccine employed were insufficient to engender a protective degree of immunity to the intracerebral injection of the 10 minimal infective doses of virus employed as a test for acquired immunity. In this connection it may be stated that a monkey inoculated intracerebrally with 0.3 c.c. of the vaccine remained perfectly well, indicating that the virus was either killed or greatly attenuated. It may be that larger doses per kg. of weight would have engendered an immunity, but none was apparent with the amounts employed.

With the phenolized vaccine both monkeys receiving the 0.5 c.c. dose developed effective immunity. With the 0.25 c.c. dose some immunity was apparently produced because paralysis did not develop until the 12th to 14th day after intracerebral inoculations of virus; but those receiving the 0.05 c.c. dose apparently developed no immunity at all. A monkey inoculated intracerebrally with 0.3 c.c. of this vaccine developed a slight degree of paralysis of the right arm 18 days later, indicating that the vaccine contained a small amount of living virus which probably accounted for the immunity engendered by the larger doses.

The vaccines carrying mercurophen 1:40,000 and merthiolate 1:40,000 engendered complete protection in the 0.5 c.c. doses. Some immunity resulted from the 0.25 c.c. dose, but undoubtedly the addition of these agents in concentration of 1:40,000 reduced to some extent the immunizing value of the ricinoleated vaccine.

That these agents, however, produced some slight destruction or attenuation of the virus is indicated by the fact that monkeys inoculated with 0.3 c.c. of each vaccine did not develop paralysis until 14 days later, whereas the ricinoleated vaccine produced paralysis in 10 days.

The results with phenyl-mercurinitrate vaccine were much better, probably because of less attenuation or destruction of the virus, since a 1:80,000 concentration was employed. Not only did both monkeys receiving the 0.5 c.c. dose escape infection, but also 1 receiving the 0.25 c.c. dose, while the second animal receiving this amount did not develop paralysis until the 21st day after intracerebral injection with virus. Furthermore, a monkey inoculated intracerebrally with 0.3 c.c. of this vaccine developed paralysis on the 9th day, indicating that phenyl-mercurinitrate in the amount employed produced no further attenuation of the virus than that produced by sodium ricinoleate.

The results have shown that the addition of 1:4,000 formalin to the vaccine results in so much destruction of virus as greatly to reduce its immunizing value. The same was found true but to a lesser extent with vaccine carrying 1:100 phenol. In other words, it would appear that approximately twice the smallest amounts of these agents required for the destruction of staphylococci and colon bacilli in

ricinoleated vaccine produce too much destruction or attenuation of the virus for effective immunization. It may be that larger amounts of these vaccines than those employed may produce some degree of immunization, but certainly not in the doses employed which, however, were highly effective with the ricinoleated vaccine.

Best results were observed with phenyl-mercuri-nitrate. Its addition in 1:80,000 dilution to ricinoleated vaccine appears sufficient for bacteriostatic and bactericidal purposes, although even this small amount may very slightly reduce the immunizing capacity of the vaccine. Mercurophen and merthiolate rank second, but must be used in a concentration of 1:40,000 and this amount more definitely reduces vaccinogenic activity. It is likely, however, that this reduction can be overcome by making the doses slightly larger than those employed with the plain ricinoleated vaccine and that carrying 1:80,000 phenyl-mercuri-nitrate. In general we believe that the results confirm the observations of others and ourselves that the maximum of immunization is to be obtained with vaccines showing the minimum destruction or attenuation of the virus.

The plain ricinoleated vaccine in the doses employed[5] produces only slight local reactions at the sites of injection. In several instances where marked local reactions have followed the subcutaneous injections we have found the vaccine contaminated with staphylococci or colon bacilli. By dispensing the vaccine in individual doses the possibility of such contamination can be greatly reduced, but when dispensed in vials carrying multiple doses contamination may occur, since the 1 per cent concentration of sodium ricinoleate in the vaccine possesses very low bacteriostatic and bactericidal activity. For this reason we now prepare the vaccine with 1:80,000 phenyl-mercuri-nitrate and use it in the same doses as recommended for the ricinoleated vaccine, since the immunizing value is almost the same. Furthermore, the local reactions at the sites of injection are very slight, since this amount of phenyl-mercuri-nitrate does not appear to produce additional irritation.

VIRUS OF LYMPHOCYTIC CHORIOMENINGITIS IN RELATION TO THE VACCINE

In August, 1934, Armstrong and Lillie[2] described a neurotropic virus in monkeys, encountered during the experimental transmission of encephalitis virus from the 1933 St. Louis epidemic and which was designated as the virus of lymphocytic choriomeningitis. Subsequently Armstrong and Wooley[3] found this virus in stock monkeys and suggested that it may affect man, since 2 of their strains were possibly of human origin. In the opinion of Armstrong and Dickens[4] the symptom complex is apparently a disease entity, producing in human beings the symptoms and spinal fluid changes commonly designated as "acute aseptic meningitis" characterized by headache, fever, and meningeal irritation, with cerebrospinal fluid under increased pressure and showing an increase of cells above 50 (lymphocytes dominating), coupled with normal chlorid, sugar, and urea content, a negative Wassermann reaction, and ending in recovery with a neutralizing antibody in the blood. Mice and guinea pigs have been found susceptible to the virus upon intracerebral injection with spinal cord and brain from monkeys, the disease appearing in mice in from 7 to 12 days after inoculation, and producing convulsions with death.

Whether or not this is a new virus occurring in normal healthy stock monkeys or a virus in relationship to that of encephalitis lethargica of human origin awaits further investigation. Fortunately, as shown by Arm-

strong and his colleagues, its presence in the brain and spinal cord of monkeys can be determined by intracerebral injections of these into mice and guinea pigs, and during the past 8 months we have routinely tested the brain and spinal cord of each poliomyelitic monkey in this manner before using the cords in the preparation of vaccine.

It has been our custom to inoculate mice and guinea pigs intracerebrally with 0.03 c.c. of a 20 per cent suspension of brain and cord from each monkey, and to keep the animals under daily observation for 2 to 3 weeks. Our *Macacus rhesus* monkeys have been obtained from India and are kept under observation for about 2 weeks before inoculation with poliomyelitis virus. We have purposely kept out of the laboratories all other viruses. Up to the present we have not encountered the virus of lymphocytic choriomeningitis in a single brain or spinal cord from 84 consecutive animals, but will continue to test the brain and cord of each poliomyelitic monkey before preparing the vaccine. In this manner we believe that the danger of carrying this virus over into the poliomyelitis vaccine is removed.

IMPROVED METHOD OF PREPARING THE VACCINE

The details of preparation are as follows:

1. Healthy adult *Macacus rhesus* monkeys weighing from 4 to 5 kg. are employed.
2. The animals are kept in quarantine for 1 to 2 weeks before inoculation, preferably in isolated quarters removed from contact with other animals.
3. No one is allowed to come in contact with the animals except members of the staff, in order to reduce to a minimum any possible contamination.
4. Each animal is inoculated intracerebrally (frontal lobe) with 0.5 c.c. of a 5 per cent emulsion of monkey poliomyelitic cord (Rockefeller Institute strain) under ether anesthesia. This carries about 10 minimal infective doses.
5. Symptoms of poliomyelitis usually develop in from 7 to 10 days. Immediately after death, or when paralysis is very severe, the hair is sprayed with 5 per cent tricresol solution and the skin over the head and back removed. The cord is then removed under aseptic conditions, briefly washed in 1:1,000 water solution of mercurophen or metaphen followed by sterile saline solution and placed in a 50 per cent sterile solution of chemically pure glycerin in saline solution. The animal is then carefully autopsied for any evidences of tuberculosis. If lesions are found the cord is discarded.
6. Then 0.03 c.c. of a 20 per cent suspension of cord is injected intracerebrally into each of 2 mice; a similar amount of brain is injected into 2 additional mice. The animals are kept under daily observation for 14 days for any possible evidences of infection with the virus of lymphocytic choriomeningitis.
7. Two or more cords kept at least a week in the glycerin are used in the preparation of vaccine by thoroughly emulsifying 8 gm. in 100 c.c. of 1.6 per cent sterile saline solution.
8. After fine-mesh filtration under aseptic conditions there is added an equal volume of 2 per cent solution of sodium ricinoleate carrying 1:40,000 phenyl-mercuri-nitrate prepared as follows:

Sodium ricinoleate (William S. Merrell Co.)	20 gm.
Distilled Water	950 c.c.
Boil for 10 minutes and add:	
Phenyl-mercuri-nitrate 1.2,000	50 c.c.

This gives a 4 per cent suspension of virus in 1 per cent sodium ricinoleate and 1:80,000 phenyl-mercuri-nitrate in physiological saline solution.

9. If mercurophen is employed there is added to the 8 per cent suspension of virus an equal volume of the following solution:

Sodium ricinoleate (William S. Merrell Co.)	20 gm.
Distilled Water	950 c.c.
Boil for 10 minutes and add:	
Mercurophen 1:1,000 Aqueous solution	50 c.c.

This gives a 4 per cent suspension of virus in 1 per cent sodium ricinoleate and 1:40,000 mercurophen in physiological saline solution.

10. The vaccine is thoroughly shaken and placed in an incubator at 37° C. for 24

hours and then in a refrigerator at 10° to 12° C. for 10 to 14 days with daily shaking for a few minutes.

11. A culture of 0.5 c.c. of the vaccine is then made in 200 c.c. of broth and incubated 3 to 5 days. A mouse is also inoculated intraperitoneally with 0.5 c.c. and kept under observation for a week for any possible evidences of tetanus infection.

12. If sterile, the final test consists in the intracerebral injection of a monkey with 0.3 c.c. of the vaccine under ether anesthesia. The animal must develop some paralysis within 3 weeks. If not, the vaccine is discarded as containing virus too much attenuated and therefore too low in immunizing value for administration.

13. If sterile and containing attenuated virus, the vaccine is dispensed for administration.

14. The vaccine should be kept in a refrigerator, but even at room temperature shows no appreciable reduction in immunizing value over periods of 1 or 2 weeks. Therefore it can be shipped under ordinary conditions without the necessity of being frozen or kept at a very low temperature.

DOSAGE OF VACCINE

The dosage of the improved vaccine according to age is the same as originally advised[5] being as follows:

Under 4 years	0.25, 0.5 and 0.5 c.c.
4 to 10 "	0.5, 0.5 and 1.0 c.c.
11 to 15 "	0.5, 1.0 and 1.0 c.c.
Adults	0.5, 1.0 and 2.0 c.c.

These amounts are given by subcutaneous injection at intervals of 7 to 10 days. As is true of other vaccines, adults may show more local reaction than children and for this reason we recommend giving the third dose by injecting 1 c.c. in each arm at the same time.

ATTENUATION OF THE VACCINE

Since the vaccine contains living remote monkey passage virus the matter of its attenuation and safety for human beings has been the main issue.

While the virus is highly adapted for the monkey as the result of a very large number of passages during the past many years, it is a reasonable assumption that it may have lost thereby at least some infectivity for human beings.

The subcutaneous and intracutaneous injection of the virus is occasionally followed by the development of poliomyelitis in monkeys, as shown by Flexner and Lewis in 1910. In a series of 20 monkeys the administration of 5 doses of 0.2 c.c. of a 10 per cent suspension per kg. at 5 day intervals produced the disease in 1 animal in our laboratory. But none of a series of 42 monkeys receiving the ricinoleated vaccine in doses as large as 0.5 c.c. per kg. every 5 days for 5 subcutaneous injections has developed the disease. Under the circumstances we have concluded that keeping the cords in 50 per cent glycerol for at least a week before the preparation of vaccine, followed by treatment of the *finely divided* tissue with 1 per cent sodium ricinoleate for 24 hours at 37° C., and at least 10 days in a refrigerator at about 10° to 12° C. results in attenuation of the virus. Since the natural resistance of monkeys to intracerebral injections of virus is known to vary and especially in relation to the age and weight of the animals, it is difficult to gauge the degree of attenuation, but the intracerebral injection of 0.3 c.c. of the 4 per cent vaccine has almost invariably produced poliomyelitis in over 40 monkeys of 4 to 5 kg. more slowly than the intracerebral injection of 0.3 c.c. of a 4 per cent freshly prepared virus in control animals, and in some instances has failed to produce infection altogether over periods of 3 to 4 weeks. Under the circumstances we have concluded that the glycerin, and especially the sodium ricinoleate, produces some attenuation of the virus and that the technic of preparing the vaccine is a matter of importance in this connection. Furthermore, the addition of 1:80,000 phenyl-mercuri-nitrate or 1:40,000 mercurophen for bactericidal

purposes appears to result in some slight additional attenuation.

We believe therefore that the vaccine is safe when prepared as described, due to some attenuation of the virus, the administration of a small first dose, the rapidity of antibody production, and possibly to the fact that the remote monkey passage virus used in its preparation has lost some infectivity for human beings, as more fully discussed elsewhere.[6]

SUMMARY

1. Occasional severe local reactions following the subcutaneous injection of the Kolmer ricinoleated poliomyelitis vaccine prepared by the Research Institute of Cutaneous Medicine have been found due to accidental bacterial contamination due to the low bactericidal and bacteriostatic properties of the 1 per cent solution of sodium ricinoleate employed.

2. It has been found that the addition of 1:80,000 phenyl-mercuri-nitrate or 1:40,000 mercurophen is sufficient for protecting the ricinoleated vaccine against accidental contamination without materially reducing its immunizing properties, especially in the case of phenyl-mercuri-nitrate. The bactericidal activity of merthiolate was found slightly less than mercurophen, but a vaccine carrying this amount had the same immunizing value as that containing 1:40,000 mercurophen.

3. The addition of 1:4,000 formalin required for bactericidal effects resulted in so much destruction of virus as to render the vaccine ineffective in the immunization of monkeys in the doses employed.

4. The addition of 1:100 phenol to ricinoleated vaccine produces too much attenuation (or destruction of the virus) for efficient immunization of monkeys.

5. An improved method is described for the preparation of the ricinoleated vaccine with phenyl-mercuri-nitrate or mercurophen carrying 4 per cent attenuated virus.

6. So far, the brains and spinal cords of 84 poliomyelitis monkeys have been found free of the virus of lymphocytic choriomeningitis (Armstrong and Lillie) but the method of preparation includes a routine test of the brain and spinal cord of each monkey for this virus before the latter is used in the preparation of vaccine.

7. Sterile sodium ricinoleated vaccine with or without the addition of 1:80,000 phenyl-mercuri-nitrate or 1:40,000 mercurophen, produces only slight local reactions at the sites of injection.

8. To the best of our knowledge there have been no cases of lymphocytic choriomeningitis or demyelinization encephalomeningitis due to the administration of the vaccine.

9. While we believe the vaccine must contain living virus for effective immunization in the doses employed, its safety for human beings may depend upon some attenuation of the virus by sodium ricinoleate and phenyl-mercuri-nitrate, the subcutaneous route of administration, a small first dose along with rapid antibody production and the possibility that the remote monkey passage virus used in its preparation has lost some infectivity for human beings by subcutaneous injection.

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Social Significance of Industrial Medicine*

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NO student of human affairs can fail to note the effects of social change on contemporary life. The present crisis has shaken to the roots our national existence, and touched every phase of our culture and civilization. Not only have our political and economic lives been affected, but the fundamental ideas and institutions controlling our every existence are being altered. The social structure of every nation is, therefore, being pitilessly scrutinized in a search for a solution of pressing national and international problems.

In the United States this examination has been directed toward an objective of material and spiritual security. To achieve this purpose successfully, a changed social mentality is necessary in view of the obligations of the new age. Obsolete concepts are no longer applicable in the explanation and control of modern problems. The transition of American civilization from its pioneer stage to its integrative and cultural stage, has necessitated a redefinition of established institutions and ideas.

Disease and medicine are two concepts that have a profound influence on our individual and collective welfare. The strength and health of a nation are made up of the vigor of its composite units, individuals and families. These values can only be maintained effectively by having them keep pace with the general progress in society. To achieve this goal, these concepts must be modified to fit in with the needs of the changing order.

Medicine has been defined as the science and art which deal with the prevention, cure, and alleviation of disease. As a science, medicine seeks to understand the problems underlying disease. As an art, it applies the knowledge thus gained to the solution of medical problems.

Primitive theories concerning disease were developed either from experience or from an animistic-religious point of view. The first hygienic rules were associated with the religious rites of early civilization. Following the discovery of the circulation and the scientific discoveries of the 17th and 18th centuries, disease was viewed as a biologic phenomenon due to morbid changes in life forms. This biologic aspect has been emphasized by the marked advances and discoveries in pathology and bacteriology during the 19th century. Disease then is regarded as a disturbance in the equilibrium of psychosomatic forms and functions.

The extreme difficulty, however, of studying the internal balance of the organism divorced from its environment has necessitated a new point of view.

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This view seeks to interpret the organism cosmically, and thus subject to the many interacting forces derived from the world in which it lives. In this sense the organism and its internal and external environment are considered as a whole.

Despite progress in the control of communicable disease thousands of people still die every year in all countries from preventable disease. Millions still suffer from tuberculosis in spite of our modern knowledge of its prevention and treatment. The average worker has a shorter life expectancy than the non-worker. Young children are still crippled annually by rickets, although this disease can be prevented. Thousands of women die annually from septic abortion because it is immoral to obtain contraceptive information. Such apparently unrelated factors as the curtailment of contraceptive advice and the reduction of public health budgets have a common effect in influencing the incidence and progress of disease. These inconsistencies are due to the operation of social forces.

Disease then becomes a problem of society like vice, war, crime, poverty, and unemployment. If we regard society as an organized system of human relationships, we find that its integrity is being constantly threatened by these crises. Society defends itself by calling upon safety factors within its own structure to correct the threats upon its unity. A study of the adjustment of society to its medical problems may furnish clues to the prevention, treatment, and alleviation of disease, a point of view not adequately stressed in the purely biologic approach to the problem.

Medicine then may be regarded as a social science, for both medicine and sociology as science and art have a common aim—the protection of human beings in society. The study of medical and social problems is the scientific phase. The practice of medicine and social work is the artistic. In the United States, the scope of social medicine has never been adequately defined. Broadly the term has been applied to any field of medicine presenting casual social factors.

Social medicine may be defined therefore as that field of medicine which, viewing disease as both social and biologic, attempts to determine the social cause of disease and to devise social means of prevention, cure, and alleviation. It is, therefore, a large field which covers social causation and diagnosis, social therapy and prophylaxis.

One of the contemporary leaders in the development of this science called social medicine is Zannger of Zurich, whose conception of social medicine is based on a broader idea of the subject of preventive medicine as it is taught in universities. According to Zannger, social medicine is related to legal medicine but not identical with it, and neither subject is identical with preventive medicine. His concept developed out of his experience in the scientific study of hazards in plants and industries. By studying the diseases caused by industrial activities and industrial accidents, by learning how to prevent accidents, and how to help the working class in protecting their health, he developed a new concept of social medicine from a medical point of view.

Social medicine from this point of view further notes the effects of unemployment on mortality, and the influences exerted by an occupation on the health of an individual. Social medicine studies the legislative and economic measures capable of diminishing the consequences of disease. These social phenomena are in a constant state of flux. What was true yesterday may no longer be true tomorrow. The leaders in social welfare should therefore endeavor to look into the future,

while university instruction should also take account of these facts.

From the time of Ramazzini, when he first called attention to the important relationships between conditions of work and the state of health, to the present, social medicine has gradually evolved into its present broad concept. It is now held to comprise all of social hygiene, legislation, the study of sociological, political, economic, and pedagogic factors, which permit its organization and its extension throughout the world.

There are two aspects of social medicine: first, the study of social factors as the cause of disease, and second, the use of social methods in the control of disease.

Except for industrial medicine, social factors as a cause of disease have been given little emphasis. Other environmental factors such as income, housing, and nutrition have been given superficial consideration.

Social methods in the control of disease, however, are well developed. Social medicine was born when communities were sufficiently organized to contain a centralized authority, well versed in the needs of the people and prepared to meet these needs with social defenses. These social defenses may be seen in such measures as social hygiene, socialized medicine, social insurance medicine, and medical social work.

The term "social medicine" has been frequently identified with these concepts of social hygiene, socialized medicine, social insurance medicine, and medical social work, but, as we shall see, it includes these various concepts yet is more comprehensive in its connotation.

Social hygiene, preventive medicine and public health are 3 identical concepts in the field of medicine that have been growing rapidly in importance in the last 30 years. Their theory is built up by the search for the relationship between environment and health; while in practice these disciplines promote and maintain the public health. The control of communicable disease, the improvement of water and milk supplies, the control of sewage disposal, and improved working conditions have had their effect on personal and community health. The population growth in Japan, for example, from 40,000,000 inhabitants in 1900 to 72,000,000 in 1935, is due in great part to the introduction into Japan of the western method of hygiene.

By socialized medicine is meant the distribution of medical service, so as to care for large numbers of people. This movement may manifest itself in many forms. State medicine, one of these forms, is a generic term and refers to any system of medical care provided by State salaried physicians. In its restricted and more usual meaning State medicine is thought of as the furnishing of medical care by the State to certain vocational groups of geographical areas. Physicians in the army or in Indian reservations, for example, practise State medicine.

Contract medicine, another form of socialized medicine is the furnishing of medical care by a physician whose income is fixed by contract. Such contracts are usually made by industrial and business enterprises, and the salary of the physician is more or less independent of the number of patients that he treats. Small communities sometimes engage the service of a physician on a contract basis, the doctor's income being derived either from the public treasury, through taxes levied on the potential patients, or from a fund accumulated by the contributions of the subscribers.

Social insurance medicine, which has been given some consideration in this country since the introduction of the workmen's compensation law, and the

anticipated introduction of sickness insurance schemes, is also a form of socialized medicine described above.

Through the insurance principle the economic risks of illness are distributed among the general population. In some countries such health measures exist on a purely voluntary basis; in others all citizens falling within certain income groups, are legally obliged to participate in the insurance plan.

Social medicine is frequently confused with medical social work. The latter is merely the application of social case work to medical service. Both are based, however, on the same hypothesis that disease and defect are never isolated but exist in a complex of personal and environmental conditions. Since these conditions may favor or hinder recovery they must, therefore, be taken into account in the treatment of illness.

Industrial medicine provides the only social orientation in American medicine. It recapitulates all the elements of social medicine, both theoretical and practical. On the theoretical side it studies the industrial environment as a causative factor in disease. On the practical side it employs all the measures of control found in social medicine.

In industrial hygiene we see the application of measures to control the industrial environment in order to prevent disease and maintain the health of the worker.

Socialized medicine is noted in the furnishing of partial and sometimes complete medical service by industry to its employees.

Social insurance medicine has its counterpart in American workmen's compensation schemes, where we find the economic risk of occupational illness and accident distributed among the general population by absorption in the cost of the finished product. In workmen's compensation we find represented forms of social insurance other than that of accident insurance. Sickness insurance, may be seen in the compensation for the aggravation of preëxisting disease. Workmen's compensation may appear to represent unemployment insurance, when injured workmen prolong their disability period over the stage of healing and repair. These men are being paid for being unemployed and not for being disabled. Old age insurance is represented by the fact that aged workers receiving minor injuries are frequently disabled totally and permanently because of their age and not because of their injury.

Medical social work is well developed in industry, with and without organized social welfare departments.

Thus we see how social medicine in theory and practice is applied to a large element of our population. This working group must not be looked upon as a special class, since today it forms the larger proportion of our entire population. The farmer is here also included since the mechanization of agriculture has changed the latter's status from that of a peasant to a worker.

The social significance of industrial medicine, therefore, is of extreme importance. Limited in the past to scattered services and an unimportant place in American medicine, the time has now come where its relationship to social medicine must take a more complete and definite form. This can only be done by a correlation of all the services and activities in the field of industrial medicine as it relates to the larger field of social medicine. The physician, the research worker, the university, the employer, the worker, and government must pool their resources and their efforts in creating a national fund of knowledge and practice, from which all who are dependent upon this information, must draw. Such a coordinated point of view demands an instrument for its achievement. This

instrument that I propose is a national institute of industrial medicine.

Many European countries have given expression to their appreciation of the social significance of industrial medicine by the creation of occupational disease institutes and safety museums. In our own country the National Safety Council was established for the purpose of educating the public to the importance of the industrial environment as a factor in illness, and in practical measures of controlling this environment. In the international sphere the value of a central agency for the promotion of the study of the adjustment to conditions of industrial life and labor led to the creation of the International Labour Office.

The latter exists as an international clearing house for the distribution of information with respect to the living conditions and employment of the workers. The disadvantage of that agency, however, in its application to our needs is, in the first place, that it is too remote geographically, and, secondly, there are too many political considerations which revolve upon its existence. The National Safety Council has a remarkable history of achievement; yet, its effectiveness has been limited by its narrow scope. There is, therefore, a real need for the creation of a national institute of industrial medicine in this country, designed to study the industrial environment as a cause of disease and the measures of social control to prevent, alleviate, and eliminate disease.

Such studies may be broadly classified into 4 categories: (1) the promotion of education, (2) the promotion of research, (3) the promotion of legislation, (4) the development of standards.

EDUCATION

Education in social medicine in which industrial medicine forms a large background, may take several forms. To begin with there is a dearth of studies in the medical curriculum with respect to the social sciences. It is appreciated that the present-day curriculum in medical schools is already overburdened. There is no reason, however, why such social studies as vital statistics, social hygiene, and economics, cannot be included in the premedical school years.

There is a great need for the extension of present-day instruction in industrial hygiene in medical schools. At present, of 85 medical public health schools in the United States and Canada surveyed by Bristol in 1934, only 13—10 medical and 3 public health—give separate courses in industrial hygiene; 24 medical schools add one or more special lectures in their general public health and hygiene courses; 18 schools give only brief attention to industrial hygiene; and another 21 apparently give no instruction in industrial hygiene. Regardless of the ultimate objectives of medical students, the social significance of industrial medicine makes it desirable to intensify undergraduate instruction in industrial hygiene.

There is also need for postgraduate instruction in industrial hygiene. This may take several forms: (1) specified courses of instruction in well equipped schools of public health, or specially created institutes, or (2) courses of study in large industrial centers for the practitioner who lives in a community where industrial health hazards are a special medical and social problem.

To overcome the reduction in the life expectancy of the average worker it is desirable that preventive work be promoted. While safety education in industry has achieved a phenomenal success in the reduction of accidents, health education in industry has failed completely in making the worker conscious of any responsibility in the

maintenance of his own health. The same technic that has been so successful in combating accidents, bringing the responsibility for accidents down to the lowest executive unit, the foreman, can be applied to industrial health education. It is this same technic that has made child health education successful by making the parent, the nearest executive unit, participate through the medium of Parent Teacher Associations.

Here then are 2 aspects of education in industrial medicine that require the support and development of a national advisory group: (1) the improvement of the equipment of those who protect the health of the industrial community, and (2) the education of the industrial worker in the care and protection of his own health.

RESEARCH

An important objective of a national institute of industrial medicine would be a clearing house of information. Such an institute would distribute this information by direct correspondence in answer to specific inquiries, by the publication of an annual bulletin and special reports.

A special function of this institute would be that of research. Here problems could be worked out from clinical, chemical, industrial, insurance, pathological, and other aspects. This does not mean that all phases of an industrial problem would be studied in one institute, but that research in these various fields could be directed to those agencies or institutions best equipped to carry them out. In this manner present-day mistakes could be avoided, namely, the duplication of effort, the carrying on of research by inadequately equipped organizations, and the failure to utilize properly equipped agencies already existing. The Du Pont Company today has an exceedingly well equipped laboratory, for the study of the toxocologic properties of their manufactured products. Many a manufacturer would consider himself very fortunate to be blessed with such a laboratory. The manufacturer of new products, unfamiliar with their physiological effects distributes his products today with a great deal of trepidation, in view of the rising incidence of litigation. There is, therefore, less reluctance on the part of these employers to survey the health problems involved in the manufacture of their products and also in the analysis of their physiological effects. A small manufacturer would appreciate knowing where his products could be studied at a small cost, or would even be willing to contribute to the support of such a central laboratory.

LEGISLATION

Ever since the law written on two tablets of stone was given to Moses on Mount Sinai, legislation has been an ideal for the expression and safeguarding of the common standards of life and conduct with authority to achieve a larger measure of social justice.

The control of widespread social evils, such as poverty, dependency, sickness, disability, and delinquency by social agencies and voluntary action has been very difficult. Their experience is valuable as a laboratory experiment to show the futility of such action. Such a law as Mothers' Pensions has helped to simplify the work of social agencies in the solution of the problem of dependent children and widows. Workmen's compensation has ameliorated the disabling effects of accident. Child labor laws have reduced mortality and disability and have given children greater psychological and social opportunity. All these objectives of social welfare promoted by social agencies have been achieved by legislation.

The basis of all legislation must be

accurate data. It is important that the legislator be supplied with information not only about the statute law of his own country and state, but also about the condition of the law and the course of legislation on the subject with which he deals in other countries and in neighboring states. For this purpose bill drafting and legislation reference bureaus have been established.

Some years ago the Wisconsin legislature voted a small appropriation for a legislative reference library, and a man carefully trained in history, economics, and political science was put in charge. With a small expenditure he rapidly gathered a valuable collection of reports, bills, and laws; catalogued and indexed them, so as to be at all times available. When the legislature convened he was ready to give every legislator important service and reliable information. No matter what subject a member might be interested in or what bill he might be desirous of introducing or fighting, he need not be at a loss as to what other states had done, how such legislative experiment had succeeded, and how to frame his own proposals. Bills were drafted for members at their own request and they were given hints on important points of practice and even arguments were prepared for them, if they wished.

The American Association of Labor Legislation has served in a similar but less comprehensive capacity for all labor legislation including that on occupational disease. Our own standards committee of the Industrial Hygiene Section has carried on a similar function in the field of occupational disease legislation. There is room and need for an expansion of such a service under the supervision of a national advisory group like a National Institute of Industrial Medicine.

STANDARDS

The rising incidence and costs of litigation in the field of industrial medicine, both under common law and workmen's compensation administration, has stimulated the formation of fly-by-night groups interested in the correction of the abuses arising out of this litigation. One of the most important abuses arises in the use of experts for court testimony. There is no agency fit to pass on the qualifications of those who are called as experts to testify in cases of occupational disease, be they engineers or physicians. It is desirable that such qualifications be established and that a panel of qualified medical and non-medical experts in industrial medicine be created under the supervision of this national institute of industrial medicine. Certification by this body would do much to correct one of the primary abuses in expert testimony.

SUMMARY

I have attempted to stress the social significance of industrial medicine and have suggested a device or agency the creation of which will materially assist in correcting some of the maladjustments in our present social crisis. If the conditions in which we live are to be improved and if social progress is to be realized, it must be within the system of the industrial order in which we live.

Efficiency of Methods and Products for Sterilization of Beverage Glasses*

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A SANITARY survey was made of establishments dispensing beer in Lansing, with the aim of introducing practical procedures for cleansing and sterilizing glassware. The procedure recommended is to wash the glasses free from any retained beer, using running tap water; they should then be rinsed in a disinfectant or rinsed and allowed to drain, for the recommended period of time to effect sterilization. For chlorine sterilizers, the most suitable compounds, 5 minutes is recommended. Following sterilization the glasses may again be rinsed in clean running water.

In the laboratory *Escherichia coli* and *Staphylococcus aureus* were independently introduced into solutions of various disinfectants. The numbers of organisms surviving after exposure of 15, 30, 45, 60, 90, 120, and 180 seconds and 5 and 30 minutes were determined by plate counts.

Sodium chloride and trisodium phosphate have been recommended for sterilizing beverage glasses. However, 5 per cent sodium chloride solution or 1 per cent trisodium phosphate was found unsuitable. Calgonite, a detergent containing sodium metasilicate, when used in a concentration suitable to the hardness of the water employed, was capable of destroying *Esch. coli* in 15 seconds; however, it had little or no effect on *Staph. aureus* in 30 minutes. Because of the apparent selective action of this compound it cannot be recommended as a disinfectant agent.

Klemm's Cleaner, a disinfectant, was found capable of destroying the test organisms in approximately 2 minutes. A very significant reduction was effected in 1 minute. However, this compound has questionable value because it produces an intense purple color and stains utensils.

Natraphene, sodium 2 — hydroxy diphenyl, has been suggested for the sterilization of beverage glasses. This compound when used in the recommended concentration of 1 to 1,000 was very slow in destroying *Staph. aureus* and *Esch. coli*. The retarded action of this compound with the lack of a suitable test for determining its concentration makes it undesirable.

Of the chlorine containing compounds examined those containing inorganic chlorine were found to be more suitable because of the speed of reaction. Two hundred p.p.m. is recommended. A more detailed discussion of these preparations was presented in a previous paper.[1] A new chlorine preparation, Azochloramid, was found to be comparable to chloramine T in its killing speed. The compound, like chlora-

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mine T products, may be used for beverage glass sterilization provided a sufficient period of exposure is used. This preparation has the added advantage that the yellow color produced is indirectly a measurement of the available chlorine present.

Hot water, as employed in a mechanical dish washer, has been found to be very satisfactory in sterilizing glasses. A minimum temperature of 160° F. (71° C.) should be maintained. On repeated tests all glasses examined were found to be free from organisms.

A device using ultra-violet light as the sterilizing agent was submitted for examination. The machine was designed to sterilize the rim of the glass while the glass was being filled. Laboratory tests disclosed the fact that the time required to effect sterilization of the rim of the glass was greatly in excess of the time required to fill the glass.

In summarizing these findings it was obvious that the most effective agents were hot water, and the sodium and calcium hypochlorites. Azochloramid and chloramine T were suitable providing the time of exposure was sufficiently long. While Klemm's Cleaner was found to be an effective disinfectant it was unsuitable because of other physical properties. Sodium chloride, trisodium phosphate and Calgonite were unsatisfactory.

The ideal beverage glass sterilizer is one which is not toxic to man, is not obnoxious in any manner, does not possess any undesirable physical characteristics, does not produce a precipitate, effects sterilization rapidly, and one the concentration of which can be easily determined.

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Group Payment for Hospital Care in New York

AFTER two and one-half years of study and preparation, which involved the enactment of an amendment to the insurance law of the State of New York, the Associated Hospital Service was incorporated in 1934 to undertake a plan of group payment for hospital care. The initial expenses of organization and promotion were met by grants from the Commonwealth Fund and the Josiah Macy, Jr., Foundation.

A campaign of public education undertaken by the United Hospital Fund's Department of Education has made the public widely familiar with the benefits of this "3¢ a day" plan. The public response to the plan was so enthusiastic and the approval of it so widespread, that in less than six months the quota of subscribers for the entire first year was exceeded. While the results have been gratifying, it cannot be expected that the volume of business will be sufficient for several years to appreciably affect hospital income, the plan being in no sense a money-making scheme for hospitals. It is rather a public service made available to persons of modest means by the hospitals.

Shellfish Report from the Standpoint of the Control of Shellfish in Interstate Shipments*

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IN applying standard methods for the bacteriological examination of shellfish, the food law enforcing officer has an objective quite in common with that of the sanitary engineer and the public health official who exercise control over sanitation surrounding production. Because of differences in jurisdiction and legal authority, the agency supervising interstate traffic must adopt control procedures different from those employed by supervisors of sanitation at the source of production. If a method of analysis is to be useful in any plan of control of interstate commerce, it should be devised to present data essential for such control under the limitations of authority imposed by the terms of the applicable law.

A brief sketch of the methods of control possible of application by agencies supervising production, and those enforcing interstate food laws will bring out more clearly existing differences of jurisdiction and authority. Since the public health officer in the producing state has ready access to the oyster growing areas he can conduct sanitary surveys of the surrounding terrain, examine bacteriologically the waters in the growing areas and inspect shucking houses. In conformity with compliance, or non-compliance with a sanitary code, the public health officer may grant or refuse certificates permitting production or licenses allowing shipment and sale. This official has power to approve or condemn entire areas of production.

In contrast to this method of control at source of production, the organization controlling interstate shipments must proceed by the objective examination of samples collected at destination, or, at best, after the shellfish have been offered for shipment. Only in a limited manner can sanitary surveys of growing areas be made. The present federal food and drugs act contains no quarantine, or embargo power, and does not provide for the issuance of licenses, or permits. While the Food and Drug Administration, for the guidance of sampling operations, does inspect food establishments, no sanitary code for oyster shucking houses is provided. In applying the food and drugs act to oysters each shipment must be considered as a single case, and the action indicated must be based on the data available relative to the individual

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shipment. The control procedure laid down in the federal food and drugs act is a process of seizure by libel of those goods which have been found to violate the law. In the sanitary control of oyster shipments, this calls for an allegation by the government that the product is filthy, or dangerous to health, and the burden of proof then rests upon the libellant to sustain these allegations.

Therefore, it is apparent that the soundness of the analytical method becomes a vital factor in the successful control of interstate shipments which are violative of the law. A standard method of examination meeting with general approval, and presenting data interpretable in irrefutable terms of filth, or danger to health, is a weapon sorely needed by the official responsible for control of interstate shipments.

Inquiry by the Referee on Shellfish Examinations has brought forth the information that in routine practice in nearly all those laboratories to which questionnaires were directed, the present standard methods [1] are being used essentially as given, with only minor variations. This might be construed as an indication that the present standard methods meet with rather universal approval. However, certain critical reports [2, 3] on the significance of the *Bacillus coli* score, the skepticism often expressed regarding the use of only shell liquor for examination, and questions raised relative to the inclusion of so-called non-fecal members of the coli-aerogenes group in computing the score, lead to the conclusion that there is no such universal approval, and that the methods as given are often followed simply because they are designated as "standard."

The unit of measurement of pollution in oysters provided in present standard methods, and the only guide available to the analyst, should his information be restricted to the results of examination of a sample, is a score arrived at by an arbitrary numerical system based on the prevalence of all members of the coli-aerogenes group. It is known that in addition to the amount of pollution present, the score is affected by hazards of sampling, seasonal variation in the bacterial content of oysters, methods of handling, and vicissitudes of transportation. It must be borne in mind that the analyst functioning in the enforcement of food laws obtains for his sample oysters, not taken directly from the growing areas, but from shipments which have been subjected to the influencing factors mentioned. It has been generally accepted that bacteria of the *B. coli* group do not tend to multiply in shell oysters after removal from the water if the oysters are maintained alive. However, reports not infrequently made of high scores, at shipment destination, in oysters from approved areas serve to confuse the administrator and becloud the significance of the score. In most cases the score, as determined in the present standard methods, for the purposes of control of interstate shipments, must be supplemented by information regarding sanitary conditions at source of production, and by some knowledge of the conditions of handling. The need for such information, which may not always be at hand, may result in embarrassment in the effectual carrying out of the purposes of the law. This condition indicates the necessity for some more definite means of measuring pollution than is prescribed in the present system of scoring.

The interpretation of the *B. coli* score on shucked oysters examined at shipment destination presents a particularly vexing problem. Recognizing that shucking operations and shipping conditions tend to disturb any correlation that might exist between *B. coli* score on shucked oysters and sanitation of the growing areas, it is extremely difficult to translate the score obtained

by present methods at destination, into terms of potential danger to health. It is particularly important that this phase of shellfish examination be given attention and study. Since shucked oysters are invariably shipped under refrigeration, which, if properly conducted, should provide temperatures below 50° F., it is possible that a differential score, based on the prevalence of fecal *B. coli*, may have greater significance than does the score determined by the procedure given in the present methods.

Standard methods[1] recommend the discontinuance of the determination of total counts of bacteria in the shell liquor. Perry[3] has shown that total counts are a better index of cleanliness in handling than is the *B. coli* score on shucked oysters when determined at the shucking house. From the standpoint of the control of interstate traffic, however, total counts, because of their variability and wide range, when determined on samples from shipments, cannot be relied upon to serve as sole evidences of unfitness. If determined as an optional procedure with shucked oysters, they may provide the food control official with some evidence regarding the general cleanliness of the product.

Legal actions under the present federal food and drugs act against shipments of polluted oysters must be based on charges that the product is filthy, or dangerous to health. In considering the sufficiency of analytical evidence to substantiate such charges, a question arises regarding the interpretation to be placed on the presence of the various members of the coli-aerogenes group. There should be no controversy concerning the significance of organisms confirmed as fecal *B. coli*, whereas there may be almost unlimited argument relative to the significance of other bacteria of the group. Therefore, in determining a course of action following the accumulation of analytical, as well as inspectional data, it is decidedly advantageous to have at hand some figures to express the incidence of fecal *B. coli* in the material under examination. The acquisition of such information would involve certain technical procedures additional to those now prescribed in standard methods for identification of members of the coli-aerogenes group. Furthermore, it would be necessary for standard methods to define what is meant by "fecal" *B. coli*. It is not difficult to identify, on the basis of colony formation, bacteria of the Aerobacter, or aerogenes section of the group. Although attended with more difficulty, it is possible, with experience and practice, to distinguish on eosin-methylene-blue agar colonies of the so-called *B. coli* intermediates.

Bearing in mind that, in taking legal action against interstate shipments, the burden of proof of a charge of filth and potential danger to health rests upon the food law enforcing agency, examination should disclose conclusive evidence of the presence of strains of intestinal origin. The significance of *B. coli* intermediates in this connection will require clarification. In emphasizing the need for differentiation of the coli-aerogenes group, it is not suggested that a score, or other numerical expression based on the group, be abandoned. Such data, considered in connection with inspectional evidence, are informative and should be of value. However, in regulatory control of interstate shipments scores based both on the group and on fecal *B. coli* at present seem desirable.

In the history of the present standard methods, a particularly controversial point has been the question of whether oysters showing a score higher than 50 should be condemned. From the standpoint of interstate control, little need be added to what has already been stated in this paper on this subject if the score is based on the presence of

all members of the coli-aerogenes group.

A procedure commonly followed in the sanitary control of oyster production involves the bacteriological examination of the waters in which oysters are grown. Attention may again be directed to the fact that in interstate control such procedure can be applied only in a very restricted manner, and only in those instances where the food control official may have access to the growing areas. Directions for making such examinations very properly belong in any procedure laid down for the sanitary control of production, but their presence in any set of directions for the bacteriological examination of shellfish would tend to confuse. If the report of the shellfish committee goes so far as to include recommendations for the sanitary control of growing areas, procedures for sea water examinations may quite logically be included. On the other hand, if standard methods are to be drawn up as a guide to the food analyst, methods for the examination of water would seem to have no proper place.

The present standard methods give directions only for the examination of oysters. Clams and other mollusks require attention, and thought must be given to the question of whether an attempt should be made to formulate one method for all shellfish or whether distinctive methods for various shellfish should be devised. Gorham,[4] in his last report as referee on shellfish examination, recommended that a subcommittee be appointed to draw up methods for the examination of clams, mussels, and other shellfish. The anatomy and habits of various mollusks differ sufficiently to make it difficult to formulate one method capable of application to all bivalves. Too little is known regarding the bacteriology of clams in relation to their environment, to predict at this time whether or not it would be possible to include in one method a procedure for the examination of all shellfish.

This paper does not include a discussion of details of technic to be followed in standard methods. Whether the practice of examining only the shell liquor should be abandoned in favor of an examination of oyster meats, or the entire shell contents, and whether the present system of scoring should be abandoned for some other form of numerical expression of results, are matters of laboratory method discussed by others. The purpose of this paper has been to present some comments regarding limitations of usefulness of the present standard methods from the standpoint of interstate control of shellfish, and to make some suggestions as to special lines of study to meet the needs of the food law enforcing officer.

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The Psychologic Factors of Health Education*

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IN health education the principal elements are: (1) the educator, animate and inanimate; (2) the thesis and act of education; and (3) the object to be influenced, *i.e.*, educated.

These elements have a variety of other names. Thus, the educator (animate and inanimate) is also termed tools or instruments; the thesis and the act are termed the content and methodology; the object to be influenced, the audience.

In all crafts and arts—and health education may be considered such—effectiveness calls for a knowledge of the nature and competencies of the tools, an appreciation of the character of the design, and an understanding of the quality of the material to be fashioned. As these are fully understood and adapted to each other, so will the end result tend to approximate perfection.

In our craft, that of health education, there is a great deal of simple technology to be mastered. A knowledge of the competencies and nature of our tools, the spoken word, the printed word, the ideogram, and all their modifications, calls for wide excursions into the technics of public speaking, printing, types, paper, layout, color combinations, drafting, etc. In the field of the technologies the notable achievements of the Routzahns are to be signalized. But in addition to the fundamental and all-essential technology, there is also in our craft a large need for psychologic understanding, for our ultimate goal is to influence behavior—dynamically or statically, and the influencing of behavior through the means of persuasion, is essentially a psychologic achievement.

For this reason we must, as we have only lately begun to do, apply ourselves to an understanding of the psychologic implications of the 3 principal elements.

Of the first element, the instruments of education, I will say little if anything. The subject is too large to be epitomized. However, it is essential for effectiveness, to know the nature and competencies of each tool, for, as the wise Goethe said " Who on efficient work is bent—must use the fittest instrument," and it is folly to cut butter with a butcher's saw, or to tickle gristle with a butter knife.

The second element, the thesis and act, commonly designated as the content and methodology, has a very distinct psychologic prerequisite, and to this I have devoted a good deal of consideration.

Let me here give but the briefest of summaries, referring the reader to the

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fuller expositions contained in separate papers.*

The methodology of health education, to which content is reciprocally fitted, has the following aims and requires these psychologic observances, namely, we must first arouse curiosity, that is, deflect or direct the stream of consciousness, awareness, and attentiveness of our audience, single or multiple, from the bedflow of its own direction into that which we desire; second, we must enlist sympathy, that is, relate our objective to the egocentricity of our audience, make them (or him) realize the intimate pertinence of the matter dealt with and the goal aimed at; third, we must impart information, *i.e.*, fit into the audience's rational scheme of things—the what and the wherefore of our objectives, thereby incidentally also making an appeal to its emotions by way of intellect, for, be it noted that all men are eager to be considered rational beings.

Fourth and finally, to lead to action, that is, to tie our objectives to the innate emotional motives and psychologic drives of the individual and thus to achieve ultimate realization of our objectives.

These 4 essential psychologic prerequisites are not to be attained in abstraction. They are essences, but they are expressed and they are affected, in quality and degree, by the nature of the instruments employed, by the skill exercised, and most by the qualities of the audience, *i.e.*, of the object to be influenced.

AUDIENCES DIFFER

Audiences differ, and as they differ their psychologic character and susceptibilities differ. Not only do audiences vary in the gross and evident categories of economics, education, and social level, but also according to race, religion, geographic origin, etc. These are obvious differences, fairly widely appreciated. Less so appreciated are the psychologic variations of the same body under different circumstances and in different environments. The mother at home and at a parent-teachers meeting, are two different individuals in whom different psychologic and emotional potentials predominate. So, too, differs the business man when in his office and when fraternizing as "Bill" at the Service Club. The common man is psychologically one mortal in his shop, another in his trade union, club, etc., and still a third in his church.

The psychologic considerations which center about economics, education and social differences of our audiences are essential, but, in themselves, all too limited to accord us an adequate picture.

There are numerous other factors which we must consider.

PRIDE AND PREJUDICE

Each and every type of audience has its singular prejudices.

When the legions of Julius Caesar threatened to revolt, he addressed them as "quirites"—Roman citizens. They objected, we are not "quirites" but "milites," not citizens but soldiers, Roman soldiers. Caesar's rejoinder was in effect "I'd hardly think so by your actions," and the issue was won in no small part by Caesar's knowledge of his soldiers' prejudices.

Again, the facetious story is told of an old Jew on the witness stand, who, when asked his age, suddenly grew deaf and heard not. To all the interpreter's refashioned inquiries, the old Jew replied with an inquiring "Ah?" Then up rose another Jew who knew the old man's superstition, and, with the permission of the court, phrased the inquiry thus: "Rebbe, may you live to be 120, how old are you?" The formula having

* The Psychophysics of Health Education.

possible if each of us were required to wrest its elements from our single lives and experiences. But Euclid having conceived and tried his theorems on the banks of the Nile, has taught all generations to measure the lay of the land. We may not play Euclid in any realms of knowledge, but in most we shall find at least one well informed and eager to enlighten us. If you would know your group, gain insight into its character, learn of its psychologic bias —deal with one of its own who is outstanding in his group, one who is, so to say, a " liaison personage " between your group and his. The priest or minister, the political leader, the journalist (this one a most valuable ally), the doctor, lawyer, educator, and leading business man, the socially prominent woman, these, if you take them into your counsel, will teach you in brief what you could hardly gather in half a lifetime of application.

Above all, bear in mind the similar dissimilarity of mankind. Bread is the staff of life and yet how different the breadstick of the Italian from the pancake loaf of the Armenian. And though each is bread, still will the one be eschewed in preferment to the other—one's own bread. It is for us to be mindful of men's preferments in instruction as in bread.

Toward Prevention of Suicide

SEVEN prominent psychiatrists and three social workers who believe, according to the press, that " the phenomenon of self destruction should be treated as a preventable disease," have formed a committee of research into the motives and impulses that lead to suicide.

A Committee for the Study of Suicides has been incorporated in New York, " to study and conduct research with respect to and to collect, edit, classify, complete and disseminate knowledge, information, data, facts and statistics concerning the history and causes of, motives for and ways and means of prevention of suicides."

The directors of this new committee are:

Elizabeth G. Brockett, social worker, New York

Marshall Field

Dr. Gerald R. Jamieson, psychiatrist, New York

Dr. Herman Nunberg, psychiatrist, New York

Dr. Henry Alsop Riley, professor of neurology and psychology at the College of Physicians and Surgeons, Columbia University

Dr. Dudley D. Shoenfeld, adjunct psychiatrist and chief of the Mental Health Clinic at Mount Sinai Hospital

Dr. Bettina Warburg, formerly of the staff of Bloomingdale Hospital, White Plains

Dr. Gregory Zilboorg, psychiatrist, New York

Dr. Franklin G. Ebaugh, of Denver, director of the division of psychiatric education of The National Committee for Mental Hygiene

Barklie McKee Henry, president of the Association for Improving the Condition of the Poor

The secretary of the committee and director of research is Dr. Gregory Zilboorg of New York.

Water Pollution Abatement in the United States*

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THE report of the President's National Resources Board, December, 1934, provided the basis for a comprehensive long range national policy for the conservation and development of our national resources.

The Water Planning Committee of the Board made the following recommendations relative to water pollution:

> That a permanent water planning section of the National Resources Board, or its successor, be established to assemble promptly the basic data which now exist in scattered places and are needed for planning the use of water.
>
> That it initiate whatever researches are needed for additional data.
>
> That it investigate water pollution in all its phases, including the effect of pollution on fish and other forms of aquatic life and organisms.

The recognized trend of public opinion toward dependence on federal regulation, as a cure-all in water pollution abatement, indicated to the National Resources Board the necessity of assembling promptly, as a criterion for sound future policies, a more dependable inventory of the status of several specific aspects of water pollution than had previously been undertaken.

To obtain this specific information and to carry out the recommendations of the Water Planning Committee, a Special Advisory Committee was appointed December, 1934, to assist the Water Resources Section in making an inventory of the present status of water pollution and control; recommend needed research studies to obtain lacking information; and formulate general future policies for the control of water pollution.†

The writer presents in this paper a review and abstract of the report of the above committee, with which he was associated in its preparation.

The committee assembled its basic information upon which to base its recommendations of future policies in water pollution control:

1. Through correspondence (supplemented in some cases by personal interviews) with responsible officials of all state agencies which it had been able to determine as concerned with administrative control of water pollution, such as state health agencies, conservation commissions, and fish and game commissions.

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* Read at a Joint Session of the Conference of State Sanitary Engineers and the Public Health Engineering Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

† The Special Advisory Committee consisted of the following members:
W. B. Bell, Bureau of the Biological Survey, U. S. Department of Agriculture
Lt. Col. Glen E. Edgerton, Office of Chief of Engineers, U. S. Army Engineer Corps
A. C. Fieldner, Bureau of Mines, U. S. Department of the Interior
Elmer Higgins, Bureau of Fisheries, U. S. Department of Commerce
Thorndike Saville, Assoc. Dean, College of Engineering, New York University
R. E. Tarbett, Bureau of the Public Health Service, U. S. Treasury Department
Abel Wolman, Chief Engineer, Maryland State Department of Health

2. Through a Joint Committee of the American Society of Civil Engineers and the American Institute of Chemical Engineers, under the chairmanship of S. T. Powell, with respect to the treatment of industrial wastes.
3. Through Sanitary Engineer H. W. Streeter, U. S. Public Health Service, on the status of standards of water as applied to pollution.
4. Through Dr. M. M. Ellis, Bureau of Fisheries, on water purity standards for the maintenance of aquatic life.
5. Through the State Planning Consultants and the Regional Water Consultants of the National Resources Board.

The report of the Special Advisory Committee presented a summary and digest of the data accumulated from their investigation under the following main divisions:

A. Status of water pollution legislation
B. Status of water pollution from public health aspect
C. Status of water pollution from biological aspects other than public health
D. Status of industrial waste pollution
E. Status of standards of water quality
F. Economic aspects of pollution
G. Recommendations

The committee reached certain general conclusions in respect to water pollution control, which may be briefly summarized as follows:

A. STATUS OF WATER POLLUTION LEGISLATION

Federal legislation—State agencies in general are opposed to any extension of federal regulatory authority with respect to water pollution control. They favor the federal government's confining its activities to investigation and research and to acting as a coördinating agency.

While federal regulatory authority over the control of water pollution is subject to constitutional limitations, it may nevertheless be broadened by Congress.

The interstate compact as a means of dealing legislatively with interstate problems is a relatively little used method of regulating water use. While its limited success hitherto might argue against its employment, the possibilities of the interstate compact as applied to water problems has not been adequately tested. Therefore further consideration must be given to such compacts as an aid to the solution of the problem of pollution administration and control.

The conclusion seems inevitable that, although interstate compacts offer a hopeful means of abating pollution of interstate streams, something more is necessary to make them effective. It appears there is a real desire by state agencies that the federal government should act in guiding and stimulating, and in an advisory capacity. Such action would be in accord with precedent and would promote conditions which would guard against discrimination between local interests and between interests of separate regions.

State legislation—Certain changes in existing state laws are needed if more effective control of pollution is desired. These should include:

a. Adequate administrative control.
b. Delegation to the administrative agency of the power to determine what constitutes that pollution which is prohibited by the statutes, and to establish limits of pollution.
c. Mandatory power to compel installations of works and other necessary action.
d. No limitation on taxing power of municipalities in application to works ordered by the administrative agency.
e. Power to require the provision of facilities through sewerage or sanitary districts or otherwise, to enable municipalities and industries to comply with the law.

B. STATUS OF POLLUTION FROM PUBLIC HEALTH ASPECT

Some progress in the provision of sewerage systems and sewage treatment plants is revealed. The conclusion is also evident that the unsatisfactory progress in sewage treatment is not entirely explained by lack of

legislation, personnel, and funds in the administration of water pollution control.

On the basis of returns which are admittedly incomplete, the following estimates are ventured.

Public sewer systems are estimated to be available to 56 per cent of the total population of the United States; that is, to about 68 million persons. The great majority of the urban population has access to such systems.

The sewage from approximately 28,400,000 persons, about 41 per cent of the urban population, is estimated to receive treatment; that from 14,600,000 persons, 21 per cent of the urban population, is estimated to receive both primary and secondary treatment. This suggests a population of some 40,000,000 persons in urban communities disposing of sewage with no treatment prior to discharge. Not all of this sewage would require treatment, but a considerable portion undoubtedly would.

In most states, present law, administrative personnel and funds are entirely inadequate. In a few states such provisions are excellent. Even in these few more fortunate states, progress toward the abatement of pollution has been unsatisfactory. The basic causes of lack of progress lie in public apathy and in the cost of remedial measures rather than in lack of legislation, personnel, and administrative funds.

C. STATUS OF POLLUTION FROM OTHER THAN PUBLIC HEALTH ASPECTS

A survey of pollution inimical to fish, waterfowl, and other wild life indicates losses of large but indeterminate proportions. The collection of precise data on these intangibles and indirect damages is difficult, as in most states no comprehensive survey has been made. Despite the great interest in sportsmen's organizations, insufficient action has been taken to abate nuisances and abuses, or even to appraise the nature and extent of the effect of pollution on fish and bird life.

In this instance also general public interest is lacking and a sound and thorough educational campaign appears advisable. A complete examination of the entire pollution problem from the point of view of its effects on aquatic life is necessary in order to determine upon the extent of the damage by pollution and upon the expenditures justifiable for its correction

D. STATUS OF INDUSTRIAL WASTE TREATMENT

Each industry presents its own pollution problems, that cannot be solved by general methods of sewage treatment. For many industrial wastes, practical and economical methods of treatment are available. For a limited number, feasible and economical processes of treatment have not yet been developed. In water pollution control, effort should be made toward recovery rather than toward treatment of wastes, wherever practicable. Because of the individual methods of treatment necessary, the prevention of pollution by undesirable industrial wastes demands the active coöperation of industry. That industry has not been entirely inactive in the prevention of water pollution is evidenced by the fact that, in 23 states, there are a total of 523 industrial waste treatment plants of various types, providing varying degrees of treatment for a large number of different classes of industrial wastes. The investment by industry in the prevention of water pollution in these states has been estimated at nearly $25,000,000.

E. STATUS OF QUALITY OF WATER STANDARDS

The use of standards of water quality is limited in this country and is marked by a lack of any general agreement as to what standards, if any, should be

applied to particular kinds of water utilization. With a few exceptions, there seems to be a growing sentiment favoring an effort to devise and adopt, for certain water uses, standards which may be acceptable to those who have to deal administratively with water pollution problems.

From the standpoint of regulation, it is believed that the time has come to determine limiting standards of pollution for at least certain classes of water subject to uses more or less common to the country as a whole. The success with which the application of the Treasury Department drinking water standard has aided in bringing about a general improvement in the quality of public water supplies affords striking evidence on this point.

Before any attempt can be made to formulate standards for general application, there is need for systematic and thorough study. Such studies should be comprehensive in scope and should enlist the services of experts experienced in the various aspects of water pollution and related problems.

F. ECONOMIC ASPECTS

There is an unfortunate, widespread fallacy to the effect that sewage and industrial waste treatment is or can be made self-sustaining or even profitable. The contrary is of course nearer the truth.

The reduction of pollution implies a cost to the taxpayer, measurable in amount. The economic losses to the public due to the failure of treatment, however, have not been evaluated, because very few state officials are willing to venture an estimate thereof. These economic losses are probably large, and tend to offset the cost of water pollution abatement, but at the moment no authoritative figures therefor can be presented.

Taking into account the expressed desire for additional federal coördination and the existence of a multitude of interstate problems, the whole matter of pollution abatement should be viewed in terms of regional social economy on the basis of drainage-basin units.

Inasmuch as substantial advantage would accrue to the national economy by the institution of measures for abatement of pollution, and as a stimulus to local initiative is essential, it seems wise for the federal government to assist in the financing of such enterprises.

RECOMMENDATIONS

On the strength of the data assembled, the special Advisory Committee on Water Pollution is responsible for the following recommendations as a policy for federal participation in water pollution control:

1. That where drainage area authorities exist for the comprehensive development and control of water, their scope be made sufficiently broad to include control of pollution.

2. That no basic changes in existing federal law with reference to water pollution control be made until the experimental program presented later herein shall have indicated whether or not such changes are desirable and feasible.

3. That simplification and coördination of state laws be effected to provide for the following minimum requirements:

a. Adequate administrative control

b. Delegation to the administrative agency of power to determine the nature and extent of pollution prohibited by the statutes, and to establish limitations of pollution

c. Appropriate mandatory powers, particularly the power to compel the installation of essential remedial works and force other necessary action

d. No limitation on the taxing or bonding power of municipalities, when applied to remedial works ordered by the administrative agency

e. Power to require facilities through sewerage districts, sanitary districts, or otherwise, that will enable municipalities and industries to comply with the law

4. That broader authorization for research be granted to those agencies of the federal

government which are already concerned with various phases of the problem, and that adequate funds be provided for properly coördinated water pollution investigations.

5. That powers and funds be granted to an appropriate federal agency to institute a coöperative program of investigation with legally constituted state agencies for such special studies as appear desirable, and particularly for the development of appropriate standards for water use and control.

6. That in order to stimulate the construction of pollution abatement works, funds for the purpose be made available by the federal government to local public and private agencies on a grant-in-aid or loan basis. Lacking any precedent for the designation of appropriate bases for such allocations, the committee recommends the creation of a demonstration unit on a river system selected for that purpose.

Lacking any precedent for the establishment of the bases for such allocations, and for federal coöperation in a program of pollution abatement, the committee recommended the creation of a full-scale demonstration unit on the Potomac River, an interstate stream of some magnitude, involving the mutual interests of four states and the federal government, to demonstrate the possibilities of: (a) better coördinated stream pollution control legislation in the states, (b) more adequate administrative procedures by state agencies, (c) the development of the legal and administrative procedures for regional or metropolitan pollution abatement authorities, (d) the coördination of municipal sewage disposal projects with state-wide or interstate projects, (e) the solution of additional industrial waste treatment problems, (f) the extension of coöperation with industry, (g) the stimulation of public demand for the adequate control of stream pollution.

For the general administrative control of this drainage basin, the committee recommended a board of 5 members, 1 appointed by the National Resources Board and 1 appointed by the governor of each of the four states comprising the drainage basin, with the approval of the National Resources Board. It further recommended that the present Advisory Committee act as the directive agency to consult with and keep informed of the activities of the Administrative Board.

The Administrative Board should be empowered to employ technical personnel; undertake investigations of scientific nature, negotiate contracts with municipalities, counties, states, and private industries; assist in the preparation of plans and specifications for works projects; and develop financial programs for accomplishing the objectives outlined.

The committee estimated the cost of the proposed Potomac River demonstration project at $15,000,000, and submitted detailed estimates of the various items of expense.

Promotion of Certified Milk

A NATIONAL campaign to promote greater use of certified milk by physicians and the general public has been launched by the Certified Milk Producers' Association of America, Inc., with the coöperation of the American Association of Medical Milk Commissions, of which M. J. Rosenau, M.D., is president.

Certified milk is now available in pasteurized form in many of the 1,000 or more communities where this honor milk supply is available.

The campaign in behalf of certified milk is under the general direction of James A. Tobey, Dr.P.H., chairman of the committee on public relations of the association. Literature on certified milk can be obtained from Dr. Tobey at 350 Madison Avenue, New York, N. Y.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

POLIOMYELITIS

THE outstanding epidemic in 1934 was an outbreak of poliomyelitis in and around Los Angeles, Calif., of which we gave a full account in our *Journal.*[1] The year 1935 has seen another epidemic, this time in the East, centering in North Carolina and Virginia. In our present issue we give descriptions of this.

During the past year two vaccines against poliomyelitis have been put forward and a number of articles concerning them have been published by the experimenters. Although the Editor has had sources of information which have kept him in fairly close touch with the use of these vaccines, comment has been withheld for reasons which seemed sufficient.

At our Annual Meeting in Milwaukee in October, 1935, a number of papers were presented, discussing the manufacture and use of these vaccines. None of these papers were published, since the Southern Branch of our Association, which met in St. Louis in November, had an extensive symposium on the subject, covering more ground than was covered at Milwaukee, and it was considered best to wait for the latest information available. We are now giving, in addition to the description of the 1935 epidemic, discussions of the two vaccines referred to and one paper read at Milwaukee. All of these papers deserve careful attention, and an editorial notice of them would not seem necessary except to bring out certain points which were not stressed at the meetings.

The first trials of the two vaccines were made without what most of us would consider proper controls. We are publishing a paper[2] given at St. Louis in which the use of a vaccine was carried out under the most careful conditions possible. It is evident that a sufficient number of vaccinations have not been done, nor have there been enough controls to form a definite opinion of either vaccine. The estimates given by Gilliam and Onstott[2] are based on an attack rate of 60 per 100,000 in children under 8 years of age. Supposing that the

vaccine was 100 per cent effective, 10,000 children should have been vaccinated, and 10,000 used as controls in order to reach a fair estimate of its effect. If the vaccine were only 80 per cent effective, it would have been necessary to use 40,000 children, and if older persons were included, it would have been necessary to increase the size of the group tremendously. These estimates are "safely conservative." Others made by competent people have run much higher. It is evident therefore that so far no effectual tests of these vaccines have been made. The number of cases, as well as the number of deaths which have occurred following the use of vaccine, and which are believed by many to have been due to one of the vaccines, are also given. In this connection, Park and Brodie,[3] whose vaccine has been fairly extensively used, particularly in Kern County, Calif., say in their conclusions that at least 50,000 more children must be observed under field conditions in order to reach a positive evaluation of their vaccine, and even this estimate is below some which have been made.

There are two points on which emphasis must be laid, one of which was not discussed at either of the meetings. Dr. Kolmer, in summarizing the cases of poliomyelitis which have followed the use of his vaccine, which he holds were not due to the vaccine, but to the fact that the children were in the stage of incubation when the vaccine was given, has mentioned that in a number of these cases the vaccine was given on one side of the body while the paralysis occurred on the other. In the opinion of competent pathologists, this means nothing, since the paralysis is due to the injury done to the pyramidal cells of the anterior horns of the spinal cord. In virus diseases especially, the effects are apt to appear at a part of the body distant from the point of inoculation.

Dr. Kolmer also repeatedly lays stress on the fact that he used "remote monkey passage virus." While he denies having made a positive statement that passage through the monkey increased the virulence of the virus for monkeys, but decreased it for human beings, he admits that he has put forward such a theory. This has been very thoroughly answered by Flexner,[4] who discusses in the same paper the striking instability of the virus of poliomyelitis.

We call attention to the paper by Dr. Thomas M. Rivers, in which he discusses at some length the virus diseases in general, with particular application of the known facts to poliomyelitis, and from these known facts, deduces his estimate of the value of the two vaccines in use and the dangers of one. Since these papers were written, at least two cases of poliomyelitis have followed the use of the vaccine which Dr. Rivers considered safe but valueless.

In April, 1935, the Director of Health of San Francisco City and County appointed an Advisory Committee to study poliomyelitis and the vaccines, in view of the presence of the disease in California, and the possibility of its reaching San Francisco. The report recommended that the Director of Public Health take no active stand favoring the use of vaccine until its value had been more fully demonstrated, and advised further that the experimental administration be restricted to properly qualified research institutions. The committee also expressed its doubt of the harmlessness of preparations containing living virus. We cannot but think that events since that time have proved the wisdom of the recommendations. On December 27, 1935, the Director issued an Executive Order calling attention to the soundness of the recommendations and prohibiting the use of "such vaccines or other similar immunizing agents" in the City and County of San Francisco.

The immediate cause of this order was a special article by Leake[5] giving 12

cases of poliomyelitis which followed the use of vaccines, with 6 deaths. This article lays stress on a point which is mentioned particularly by Rivers; namely, that the appearance of neutralizing antibodies in the blood after the injection of the virus of poliomyelitis is not positive evidence of an immunity to the natural disease.

We believe that the symposium contained in this issue is the most complete discussion of poliomyelitis as it exists in the United States which has been published. There are many other points to which attention might be called, but we ask our readers to study the articles instead of depending on an analysis, even if it were more extensive and perfect than is here given.

We believe thoroughly in experimental work, and nothing said here should be interpreted as a warning against the study of vaccines for the prevention of poliomyelitis. We all hope sincerely that these and other studies may lead to the discovery of a vaccine against this dreaded disease, but we deprecate the style of advertisement which has been given to these vaccines, particularly in the lay press. Dr. John F. Landon has called attention to the damage being done and asked that some authoritative body, such as the New York Academy of Medicine, sponsor a statement prepared for the public as to the status of vaccines against the disease. We commend this idea to the attention of health officers and medical men generally, and again urge our readers to study carefully the material on the subject given in this issue.

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2. Gilliam, A. G., and Onstott, R. H. Results of Field Studies with Poliomyelitis Vaccine. *A.J.P.H.*, Feb., 1936.
3. Park, William H., and Brodie, M. Active Immunization Against Poliomyelitis. *A.J.P.H.*, Feb., 1936.
4. Flexner, Simon. Special Article concerning Active Immunization in Poliomyelitis. *Science*, Nov. 1, 1935, pp. 420–421.
5. Leake, J. P. Poliomyelitis Following Vaccination Against this Disease. *J.A.M.A.*, Dec. 28, 1935, p. 2152.
6. *New York State J. Med.*, Sept. 15, 1935, p. 939.

NOTE: The Park and Brodie vaccine has been withdrawn from use on human beings at the request of the directors of the Warm Springs Foundation in Georgia. It is understood that the Foundation has been supplying funds for research in the development of the vaccine.

A BETTER DRUG ACT OR ONLY THE OLD ONE?

S-5 IN THE MAKING

MEDICAL and health and consumer interests hailed the original Tugwell-Copeland Bill in 1933 as expressing a courageous stand of the Roosevelt Administration against the most widespread and lucrative abuses of present-day free commerce in drugs among the people of the United States.

Today after the persistent and successful attacks upon its purpose, integrity of expression, and verbal form, S-5 is as nearly futile and innocuous as the most resourceful drug manufacturer, advertiser, and salesman could desire.

Either the Bill as passed by the Senate at the last session, and now in the hands of the House Committee on Interstate and Foreign Commerce, should be altered to provide some tangible improvement in the drug and cosmetic trade for the safeguarding of the average consumer's health, or it ought to be voted down as unworthy.

Before agreeing to the latter confession of failure, of abject capitulation to the commercial promoters and advertisers who see in medicaments only objects of exploitation for cash profits, we believe five separate and distinct changes in the present text of the bill should be urged upon the appropriate Congressmen by the state and local health officers, and by representatives of all nonofficial health agencies throughout the nation.

The five indispensable changes are the following:

1. Omit the phrase on page 2, lines 10 and 21, "and not for the regulation of the legalized practice of the healing art." Chapter II, Section 201, b and c. This sly little phrase would permit a multitude of abuses by "shyster" practitioners who could carry on an extensive business in the sale of adulterated and misbranded drugs and devices under the guise of professional practice.

2. Delete the sentence beginning on page 13, line 21, authorizing variations from Pharmacopoeial standards, which makes the new bill in this respect practically identical with the present act, and replace it by much more stringent requirements.

3. Section 601 (False Advertisement), page 21, now under attack and likely to be weakened, or its enforcement assigned to the Federal Trade Commission, should be preserved or made more effective, and its enforcement definitely established under the Food and Drug Administration of the Department of Agriculture.

4. Under Section 711a, page 36, the proviso, lines 10–18, should be stricken out as it weakens the seizure provision of the present law and would unduly hamper the government in proper seizure on evidence of misbranding. In matters of this kind where the public health is at stake or where flagrant deception of consumers exists, no restriction should be placed on the exercise of seizure to remove offending goods from the market before they reach consumers and do their damage.

5. Under the same Section 711a, on page 36, the provision, lines 18–20, "That said single seizure action shall on motion, be removed for trial to the jurisdiction of the claimant's residence," should be deleted so that, as under the present law, the action will be tried where the seizure is made—that is, in the consuming rather than the manufacturing jurisdiction. For the same reason a similar change should be made in paragraph (b) of this same section by striking out the words on page 37, lines 6 and 7, "or for the district of the claimant's residence."

There is some merit in the Bill as it now reads but hardly enough to justify any support by health, or medical, or consumer interests.

With the changes suggested it could become a powerful weapon of offense or defense for the welfare of the public.

AMERICAN CHILD HEALTH ASSOCIATION COPYRIGHTS TO THE AMERICAN PUBLIC HEALTH ASSOCIATION

IN the advertising pages of this *Journal* a list of publications appears which were prepared and formerly distributed under the aegis of the American Child Health Association.

The Executive Board of the American Public Health Association has acknowledged this gift with appreciation and has approved the transfer of 15 copyrights in the name of the American Child Health Association. The publications these

documents cover are now the property of this organization. These, together with certain instruments of measurement developed by experts of the American Child Health Association and additional books and pamphlets, the copyrights of which are still owned by the original recorder, are now available through the Book Service.

By keeping alive and current these valuable aspects of the work of the now dissolved American Child Health Association, we shall hope to continue the service so competently rendered to the public health profession by that agency in the past.

ANNA M. PABST

RESEARCH has claimed another victim. The Public Health Service has recorded on its special honor roll Anna M. Pabst, who died of meningitis on Christmas night in Washington, D. C. Miss Pabst was working on meningitis serum. While injecting an animal on December 17 at the National Institute of Health, it moved and some of the culture was squirted into her eye. In spite of prompt cleansing she was stricken on December 21 and died on December 25. She was very highly regarded at the National Institute of Health.

Those who use biological products, which have done so much to take away the dread of many diseases, do not realize the risks that laboratory workers run in their study. Science has an entirely too long roll of honor brought about by accidental infection in studying disease. This *Journal* and the Association which it represents unite with others everywhere to honor this latest martyr to science.

THE OPEN FORUM

REGINALD M. ATWATER, M.D.
Executive Secretary, American Public Health Association

DO YOU USE THE EMPLOYMENT SERVICE?

ATTENTION is called to the fact that the Association has for years maintained an exchange between employers and employees in the field of public health.

In 1936 it is planned to expand and improve this service with special reference to the demands which may be made upon the Association as a result of the application of the Federal Social Security Act. A systematic recording of all persons trained and experienced in technical public health activities is being compiled for the benefit of agencies of the United States Government and of the state departments of health.

Persons desiring to register in this connection should write to the office of the Executive Secretary for the appropriate blanks. No charge is made for the service of the Association or for publishing announcements of applicants who are members or Fellows.

The attention of prospective employers is directed to the fact that announcement of examinations through civil service channels or otherwise will be carried in the *Journal* without charge and that they are welcome to consult the Association on matters of employment. It is the policy of the American Public Health Association to assist employers and employees, properly qualified, to get together. It is not the policy of the Association to recommend employees for particular positions.

END OF YEAR PUBLICITY

I HAVE been interested to see this year how many good health officers are taking advantage of the timely interest of the public in the records for 1935 by having a summary of health department results ready for publication promptly after the close of the year. Some of the department are evidently closing their books a bit before December 31, in order to take advantage of the psychology that comes with new year time.

Among the releases which were ready this year, I was struck by that of Baltimore's City Health Department in which the outstanding problems of the city are thoughtfully presented by Dr. Williams and Dr. Fales. Syphilis is presented as an outstanding enemy of health, and it interested me to follow through to see how much newspaper coverage a statement of this sort received.

This statement has appeared in conservative papers throughout the city, and " syphilis " has been repeated more frequently than is customary because of the emphatic way in which the facts are presented. The matter is covered editorially very well and, in addition, there is a comment by one of the regular columnists which rather effectively brings the attention of the public to the health department.

Most outstanding, however, is a Christmas Eve editorial in one of the papers which, under the title of " Glad

Tidings," recommends attention to the report because of its good news on the control of diphtheria, and goes on to say that, if only the shame and secrecy with which syphilis is surrounded could be overcome, it would be possible to rid society of this menace as well in a generation.

We have waited a long while for the papers to turn about face on their attitude on syphilis publicity, but this time seems to have arrived in Baltimore.

THE CENTURY MARK IN LIFE MEMBERSHIPS

IT is a pleasure to record that the number of Life Members in the Association has reached and passed the hundred mark with the beginning of 1936.

One hundred and five of our members who believe in the Association and who know their own minds on their professional careers have chosen this means of relieving themselves of all future worry about dues. And they have in the aggregate saved money, too. Have you considered this opportunity at the beginning of 1936? "It's smart to be thrifty."

DO WE HAVE CLEAR THINKING STUDENTS TODAY?

DR. Thomas Parran, Jr., in his Biggs Memorial Lecture, given on May 2, 1935, quoted from the graduation thesis 54 years ago of Dr. Hermann M. Biggs, who was a candidate for the bachelor's degree in Cornell University. The subject of the thesis was "Sanitary Regulations and the Duty of the State in Regard to Public Hygiene."

These abstracts from Dr. Biggs's thesis are so revealing and shed so much light on the insight which Biggs had half a century ago that they are reproduced here. I believe they should be made a matter of record more widely available.

> This is a period in our national history in which sanitary science is receiving a large and constantly increasing share of public and professional attention. The last half century . . . has been marked by great advances made in this direction; advances which we may reasonably believe are but first indications of the greater developments in the future.
>
> The enjoyment of health, immunity from suffering, and long life, are the greatest temporal blessings that man can desire. . . . There are certain natural and sanitary laws that regulate the functions of life, . . . insure a more uninterrupted enjoyment of health, exemption from many infirmities, and a prolonged existence.
>
> Upon the recognition and careful observation of hygiene laws depend the healthy physical condition, and so the prosperity not only of individuals and communities but also of whole states and nations. . . .
>
> . . . There are other considerations far higher than the financial one which render governmental action in regard to the public health imperative. . . . Not only is the physical condition of a public dependent upon their sanitary surroundings but their moral and intellectual condition is also largely determined by those same surroundings.

Through several sessions of the Legislature from 1919 until his death, Biggs fought for an integrated system of preventive and curative medical service in the state. He proposed:

> 1. To provide for the residents of rural districts, for industrial workers, and all others in need of such service, scientific, medical, and surgical treatment, hospital and dispensary facilities, and nursing care at a cost within their means, or, if necessary, free.
>
> 2. To assist the local medical practitioner by providing facilities for accurate diagnosis . . . both hospital and out-patient; consultation and advice as to treatment by medical and surgical experts; clinical, pathological and chemical laboratory service and X-ray facilities, at a moderate cost or free when necessary.
>
> 3. . . . Facilities for an annual medical examination . . .
>
> 4. . . . Adequate school medical inspection and school nursing service.
>
> 5. . . . Better . . . administration of public health activities . . .

6. A public health nursing service adapted to and adequate for the community served.
7. . . . Dissemination of information in regard to public health . . .
8. Adequate compensation for medical and surgical service rendered in hospitals and clinics . . .
9. Laboratories, diagnosticians, consultants, and hospital facilities in the smaller cities and rural districts.
10. Medical libraries and health educational material.
11. Hospital and other necessary resources for dealing promptly with epidemics.
12. . . . Prompt and accurate diagnosis and surgical treatment for sick and indigent (industrial) workers and members of their families.
13. Coördination of public health activities within the districts.

WILL YOU BE IN ENGLAND THIS SUMMER?

THE Royal Sanitary Institute will meet again in Southport, England, July 6 to 11, 1936. At its meeting on December 19, the Executive Board authorized the Executive Secretary to appoint members of the Association who might be in England during the days of this health congress to represent the Association. The Executive Secretary will be very happy to have word from any members or Fellows who plan to be in England at that time.

"THE CONTROL OF COMMUNICABLE DISEASES"

THIS new publication which was announced at the Milwaukee meeting has already gone through a large edition and is being reprinted. Orders have been received from all sorts of official and private agencies. One state health department is considering an edition of 2,000 copies with its own imprint, as the document has been made official. It carries also the approval of the Surgeon-General of the U. S. Public Health Service. Have you your copy? Is your staff completely supplied? It is doubtful if there is any other publication at the price of this edition which answers so many questions in so authoritative a way.

FOR YOUR LITERATURE TABLE

A BOOKLET entitled, "Your Friend, the Health Officer," written by Dr. Wilson G. Smillie of Harvard, has recently come to my attention, a publication of the Life Conservation Service of the John Hancock Life Insurance Company, of Boston. This is a very readable story about the health officer's function which might be of utility in many places where the public service rendered by the health officer is still regarded as a mysterious occupation, easily to be dispensed with.

A MANUAL FOR TEACHERS

AN unusually attractive document has come to my desk from Madera County, Calif., of which Dr. Lee Alexander Stone is the full-time Health Officer. This publication, which is called "Principles of Good Public Health Practice," is a manual for use by the principals and teachers of the schools in Madera County. It is a mimeographed publication of about 100 pages, made unusually attractive through various typographical means. It answers a thousand questions of the school teacher on health subjects. Although claiming no originality in the publication, there is reflected something of a different quality from many publications of this sort and, if a county of 18,000 persons with limited financial resources can produce as creditable a manual as this, it ought to be equalled by a good many larger units.

TOXOID ITEM

THE Dionne Quintuplets have each received three doses of diphtheria toxoid from Dr. Dafoe and Dr. A. L. McKay of the Ontario Department of Health. This fact should encourage

many a parent to do likewise if health departments will utilize this news.

A CORRECTION

THE chart illustrating the usual course of measles carried in this column last May (page 641; also page 1354) which was credited to the Michigan State Department of Health should have been credited to the originator, Dr. Charles F. McKhann of Boston.

ARE YOU "CAUGHT UP"?

DO you ever get caught up on public health education? If you do, this story relayed by a friend in West Virginia will certainly have an appeal. He tells of a neighbor of his, a Portuguese farmer, to whom he offered a book on crop rotation and soil rejuvenation. The farmer refused it, saying: "I don't farm as good as I know now." How many people do not live "as good as they know" now?

PUBLIC HEALTH EDUCATION*

The Quints as Health Educators —Is it not likely that great numbers of people have been reading about the better care of babies who would refuse to look at a health department article in the newspaper? And all because of the gold fish life of 5 little girls!

Today's headlines in one evening paper:

> Quints Display Curiosity, Not Fear, As Doctors Administer Toxoid.
>
> The Quints Make a Game of Diphtheria Injections; Marie Cries, but All Others Gurgle with Glee.

Here is part of the report of the third injection:

> The scientific care which has brought the Dionne quintuplets safely through 19 perilous months has now also provided them with the best known protection against diphtheria.
>
> Despite the nursery precautions against infection and despite the almost perfect health of the babies today, Dr. A. R. Dafoe decided to take no chances with diphtheria. He felt that without special toxoid protection the risk of that deadliest scourge of childhood was too great.
>
> So the 5 little sisters have now successfully completed a course of 3 injections each of anti-diphtheria toxoid. The first treatment was in November and the last just before Christmas.

The N.E.A. Service report then quotes Dr. Dafoe and Dr. J. A. Faulkner, Provincial Minister of Health, who say what health officers have been telling their publics for a number of years. And these quotations have been published widely all over the United States and Canada.

One of Six—At St. Louis, during the meeting of the American Association for the Advancement of Science, a special interview was given by the Association president, Dr. Karl T. Compton, who is president of the Massachusetts Institute of Technology.

Dr. Compton offered a 6-point program for the broad welfare of the nation, one point being as follows:

> Recognize prevention and conquest of physical and mental diseases as far more economical and humanitarian than merely the care and treatment of those already afflicted.

Educate Them All—C. E. Davis discusses "The Rôle of the Hospital in the Education of Doctors, Nurses, and Others Engaged in the Care of the Sick." The "others" include

> The housekeeping personnel, made up of the janitors, window washers, maids, sewing women, laundry workers,

all of whom play an important part in the hospital environment. The author is more insistent upon learning ability being limited to the young than the studies of E. F. Thorndyke would seem to support.

In *Hospitals,* 18 E. Division St., Chicago, Ill. Jan., 1936.

The Hospital in Health Education —Says Ira V. Hiscock, "Mutual Interests of Hospitals and Public Health Organization":

> The hospital and the clinic have a responsibility for the education of both patients and personnel. The opportunities of health education in the clinic have been ably discussed by Galdston, who urges that the clinic, instead of being only a place to which the lame and the halt go for cure, might also serve as a center where persons

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* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

might be instructed on how to keep well. Our present-day knowledge of the nature of disease indicates that to cure a patient we must also teach him. Preventive medicine, even more than curative, depends for effectiveness upon education. Dr. Lawrason Brown, speaking on the rôle of education in the treatment of tuberculosis, said that he looked upon the sanatorium as a sort of college where men and women were reëducated in a newer method of living. If the tuberculosis patient needs to be reëducated to a newer method of life, many other types of patients, both in the clinics and in the hospitals may likewise be served.

The clinic offers an excellent opportunity for general health education through visual methods and literature, and for special instruction regarding immunization against disease. Through physicians and nurses in maternity and children's hospitals, a unique opportunity for instruction in maternity and child care is provided.

The clinical-pathological conferences in some hospitals, besides special lecture series, are valuable from a public health viewpoint as well as for clinical purposes. High standards of medical and surgical practice favorably influence the public health experience of a community. Stimulus may be given to house physicians to take epidemiological as well as purely clinical histories, and to consider the social backgrounds of their patients in relation to other problems. Such topics as the indications for the use of anti-pneumococci serum and the importance of filling out case records properly are timely. The Connecticut Department of Health makes a valuable contribution to the education of pupil nurses through a course of public health lectures given upon request at nurses' training schools.

In *Hospitals,* American Hospital Association, 18 E. Division St., Chicago, Ill. Jan., 1936.

By Pennies and Half-pennies—The Boston Health Department and other agencies are interested in a new exhibit project described in *Bulletin,* Boston Council of Social Agencies, 43 Tremont St., Boston, Mass. Dec., 1935.

The Health Education Committee of the Boston Health League is much concerned with the question, for many people, of obtaining sufficient food in the face of rising food costs and limited incomes. At a meeting in the early fall, it was decided that a series of food exhibits demonstrating elementary principles of nutrition, if placed in the Health Units, would be seen by large numbers of people and would be a practical method of teaching food values and how to spend food money to help insure good health. The present plan contemplates one new exhibit each month, moving the preceding one to another Health Unit.

Enthusiastic coöperation in working out the plans has been given the committee by the City Health Department, the Department of Public Welfare and the nutrition workers of the voluntary agencies.

The first exhibit depicts the importance of including in the day's meals the whole-grain bread and cereal. Gay yellow streamers lead from loaves of bread, and red bowls containing cereals, to charts that show plainly how the different kinds of bread and cereals compare in their content of iron, while shining new pennies or half-pennies indicate the cost of a single serving. The observer sees that a certain cereal is a little more expensive than another, but also that it contains more iron and should, therefore, be his choice.

The Editorial of the Month—Under "Medicine's Academy" the *New York Times* (Jan. 3, 1936) said:

The arts, letters, and sciences have all their "academies," but nearest to the public is the academy concerned with the health of the people. The president of the New York Academy of Medicine, Dr. Eugene H. Pool, emphasized this relationship in his address last night at the annual meeting, for while the academy seeks directly to keep the profession informed as to advances in medical science . . . its ultimate interest is in the health welfare of all the people of the community—individually and collectively.

To that end it maintains an information bureau for the receipt of inquiries from any quarter. Thousands of these are made in the course of the year and answers given, carrying to home or office the latest and best information that the science has to offer. But it does far more than answer individual and organizational inquiries. It furnishes "releases" to the press on important medical subjects and arranges for radio addresses over the major systems—especially addresses by fellows of the academy which reach practically every part of the country. It also assists public health

organizations in their educational activities. In addition to these, lectures for the lay public are given in the academy's lecture hall.

Every month we would like to reproduce at least a part of a newspaper editorial. Please submit your nominations.

New York City Is Broadcasting—These paragraphs are from the 1934 annual report of the New York Tuberculosis and Health Assn., 386 4th Ave., New York City:

The radio service, which is conducted in coöperation with the Medical Information Bureau of the New York Academy of Medicine and the local county medical societies, reaches vast numbers and makes possible a well rounded health education program throughout the year. So established are the high standards of this coördinated service on the air that the stations look to it for information, not only in connection with the subjects that form the Association's main concern, but also in regard to many other matters pertaining to health.

Last year a total number of 381 radio broadcasts reached audiences listening in on 13 different stations in New York City alone. These stations are exclusive of the nation-wide networks where our programs have been offered by one of the broadcasting companies to its complete network of 100 stations throughout the country. Certain weekly programs have included as many as 150 stations, and during special campaigns, this number increases.

The majority of these broadcasts are given by physicians, fellows of the New York Academy of Medicine, and members of the County Medical Socities, as well as by members of the dental societies and by professional workers representing social and health agencies.

The broadcasts given during the Early Diagnosis Campaign covered various phases of tuberculosis prevention and work in child health. During the Christmas Seal Campaign, talks and special features were planned for which we enlisted the services of outstanding public health authorities and well known radio personalities. Other related health subjects were covered as season and occasion warranted.

Radio in Canada — "Common Colds," by Gilliam David, is a radio play written for the Health League of Canada. After 10 years of broadcasting health talks by the Canadian Social Hygiene Council a committee was called in the summer of 1935 to study radio education.

The suggestion was made that instead of the regular talk of 12 to 15 minutes, which had previously been used, an attempt be made to dramatize these talks and produce interesting plays and dialogue which would contain much helpful information and at the same time provide a good radio entertainment.

Therefore it was decided that an attempt to produce such plays be made. The committee now announces that a series of 6 such dramas and plays have been written and transcribed electrically for use by radio stations. It is hoped that the series will consist of 24 plays and dramas dealing with such subjects as Common Cold, High Blood Pressure, Anemia, Diphtheria, Preventive Medicine, The Work of the Health Officer, etc.

The manuscript of the plays has been written by Miss Gilliam David. A suitable cast has been chosen and rehearsals have been carried out faithfully until suitable discs have been produced.

Stations located in many parts of the Dominion have agreed to make use of the transcriptions.

In *Health,* 105 Bond St., Toronto, Ottawa. Dec., 1935. *15 cents.*

How to Get Good Housing—This is a sub-heading in "Health and Housing," by Dr. R. St. J. Macdonald in *National Health Review,* Ottawa. Oct., 1935. No subscription price.

The three elements necessary "in order of importance," as outlined by Dr. Macdonald, are education of the public in house hygiene, legislation, and law enforcement.

The people must be told what bad housing means, its evil effects upon their own and their children's health, and how the menace may be averted. They should also have explained to them the essential requirements of a healthy home, so that they may be able to secure one when renting or building.

This education must be extended to all the people, not alone to the housewives who generally do the renting, but also to legislators, architects, builders, land-owners, surveyors, engineers, landscape artists, etc. In addition, janitors, guardians or custodians of dwelling-houses should be given courses in their management.

While, primarily, builders erect houses to make money out of them, yet it must be realized that they may sometimes put up unhealthy dwellings because of ignorance of housing evils, or because they know how frequently housing laws are not enforced.

The people must be educated in personal hygiene. They must be shown the manner in which communicable diseases spread. They must be told that room overcrowding is dangerous; that if a well person sleeps with a coughing case of tuberculosis, there is great danger of the former's contracting the dread disease. It must be explained that a tuberculous person occupying a separate, well lighted and well ventilated room is not dangerous to others if proper precautions be taken. It must be stressed that children cannot grow into healthy, useful citizens if they are brought up in dark rooms; that, like cellar plants, they will be pale and frail weaklings.

Then follow paragraphs about the part of teachers, visiting nurses, general practitioners, the press, public health workers, and social workers.

Ammunition for the job of education is supplied in "America Becomes Housing Conscious," by J. E. Davies, in *Journal of N.E.A.*, 1201 16th St., N.W., Washington, D. C. Dec., 1935. *25 cents.*

Some of the sub-headings will indicate the interesting nature of the material:

Is this a high standard of living? . . . Where children and flowers cannot thrive. . . . Slums—the most costly housing. . . . Cities that don't just grow. . . . Houses at the store. . . . Teaching housing in the schools.

Bulletins or House Organs—Once a year it seems worth while to review the high lights of the contents of the numerous periodicals issued by departments and associations. Unfortunately we are limited to those publications which are received by the editor.

The tuberculosis issue of *The Commonhealth* carries 19 articles. Massachusetts Dept. of Health, Boston. Jan.-Mar., 1935.

The *Red Cross Courier*, Aug., 1935, has a page on "The War Against Pellagra"—from 1735 to Red Cross activities in 1935.

"With the Wisconsin Editors," a section of *State Board of Health Bulletin*, Madison, Wis., reproduces editorials on public health topics.

"A Sanmag Scrutiny," by Elizabeth Cole, and "The Hardest Year" (the first), by J. E. Windram. Not to be missed by those concerned with publications in sanatoria. *Journal of the Outdoor Life*, 50 W. 50th St., New York, N. Y. Dec., 1935. *15 cents.*

More notes next month.

Let's Talk It Over—We have made but a hopeful beginning in the "talking it over" approach to interest and understanding as to public health. "Good References on Discussion Meetings, Open Forums, Panels, and Conferences," by M. R. McCabe. *Bibliography No. 30* issued by Office of Education, Washington, D. C. A 9 page pamphlet listing articles, pamphlets, and books, some of which are sure to be available or easy to secure. *Free.*

Public Health at State Fairs—State departments becoming interested in making use of space at state fairs may wish to consult the state departments of Ohio, Illinois, and New York, which had extensive displays last summer or fall.

State Health Education Workers—Again we have the annual directory of State and Insular Health Authorities, in *Public Health Reports*, Washington, D. C. Dec. 20, 1935.

The following health education titles are listed:

Connecticut: Bureau of public-health instruction
Illinois: Division of public-health instruction
Indiana: Bureau of health education
Iowa: Division of child health and health education
Kansas: Division of public health education
Kentucky: Bureau of public health education
Maryland: Committee on public health education
Michigan: Bureau of education (director, assistant director, lecturer)
New Jersey: Bureau of public-health education
New York: Division of public-health education
Ohio: Bureau of publicity
Pennsylvania: Division of public health education
Texas: Bureau of public health education
West Virginia: Bureau of public health education
Wisconsin: Bureau of education

As may be noted four states are "public-health," while six are "public health."

Only one state lists more than a single person in the bureau or division.

Hygeia, January, 1936—Published at 535 N. Dearborn St., Chicago, Ill.

Does illness begin at forty? . . . Curious stories about health. . . . The 1936 models in diet. . . . Pocket calorie index (illustrated chart). . . . The riddle of the blood relation (a medical mystery). . . . Which is the weaker sex? . . . Health gadgets for the gullible. . . . Toys and games that teach and train. . . . P.A.D.—Prevent asphyxial death. . . . Glands—their influence on body build and behavior. . . . Edward Jenner. . . . Rickets. . . . Mouth reconstruction. . . . What is a mastoid? . . . Venereal disease—the modern plague. . . . Puberty in fact and fancy. . . . Budgeting the reserve strength of the heart. . . . New traveler's clothing. . . . The lens maker (a play). . . . New health books. . . . Questions and answers.

In "School and Health" section:

When a child is mentally healthy? . . . Health teaching in January. . . . A classroom demonstration in nutrition. . . . A health play brings interesting and effective results. . . . New health books for teachers and pupils.

DATES AHEAD

February 9—Incorporation of American Social Hygiene Assn. in 1914. An anniversary significant in the social hygiene movement.

February 10—The first hospital in the modern sense of the word, the Pennsylvania Hospital, opened its doors to patients in 1752.

February 22—Washington's Birthday. An opportunity for contrasting health conditions and the care of the sick of Washington's time with what prevail today.

March—The first visiting nurse started her rounds to the sick poor in March, 1877, although an untrained woman visited disabled sailors and soldiers in Charleston, S. C., in 1813.

Additional information about the above and future dates will be found in "News Almanac for Social Work" for 1936. Community Chests and Councils, Inc., 155 E. 44th St., New York, N. Y. *50 cents.*

A first use for such dates may be in staff meetings and in staff house organs, with possibilities for wide utilization in the newspapers, by radio, in meetings, etc.

FOR REFERENCE OR EDUCATION

"Competitive Plagues of Mankind," by D. B. Armstrong, M.D. Reprint. Metropolitan Life Insurance Co., 1 Madison Ave., New York, N. Y. Heart disease, cancer, pneumonia, accidents, tuberculosis.

"Don't Spare the Soap!" by Shirley Wynne, M.D. Reprint. Free, from Health Cleanliness Service of Procter and Gamble, 80 E. 11th St., New York, N. Y.

"The Economic and Social Aspects of Socialized Medicine," by Iago Galdston, M.D. Reprint. Address the

author, 2 E. 103d St., New York, N. Y.

Four page folders; limited, well written text; plenty of white space; from New York City Department of Health: "For Expectant Mothers," "Gonorrhea," "Syphilis."

"Growth of School Leisure Time," and "School Health Problems Through the Years: Boston Public Schools 1635–1935," by J. P. Sullivan, supervisor of health education, Boston School Department, Boston, Mass. Reprints. Address the author.

"Health Facts," a "scrap book" of selections for use in writing about public health. Grouped under "Health Can Be Measured," "Health Can Be Purchased," "What Tax-supported Health Agencies Do," and "What Voluntary Health Agencies Do." 24 pages. *20 cents.* National Health Council, 50 W. 50th St., New York, N. Y.

The latest addition to the group of aids for those concerned with housing is *Housing Digest,* a mimeographed bulletin issued by Housing Division, Public Works Administration, Washington, D. C. This is "an abstract and index of current thought on housing problems, foreign and domestic." Intended primarily for a busy staff it is likely that copies will be sent upon request from a public health worker.

Most of the publications of the former American Child Health Association will be handled by the American Public Health Association and by the National Education Association, 1201 16th St., Washington, D. C. Those handled by the A.P.H.A. are listed on pages XIV and XV of the advertising section of this issue.

"National Aspects of the Social Security Program as They Pertain to the Children's Bureau," by Katharine F. Lenroot. Reprint. Children's Bureau, Washington, D. C.

The November releases of Health News Service, 22 E. 40th St., New York, N. Y., covered mouth hygiene subjects. Child hygiene was presented in January. This material is supplied free for newspaper use. A new service illustrates the answers to health questions. The style is that of the familiar "Believe It Or Not." Be sure to get samples. May be used in different ways.

"The Pro and Con of Vitamin D Milk," by F. O. Tonney, M.D. Reprint. Address the author: 6737 Greenview Ave., Chicago, Ill.

"Public Health Service Milk Ordinance and Code: 1935," is a fully indexed pamphlet with halftone and linecut illustrations. Superintendent of Documents, Washington, D. C. *15 cents.*

The recent annual meeting of National Society for the Prevention of Blindness, 50 W. 50th St., New York, N. Y., included a session on "The Problem of Fireworks Accidents." Four of the addresses are available in mimeographed form.

"What Is the Early Case?" In *Tuberculosis Abstracts.* Dec., 1935. Free from a tuberculosis association.

GRAPHIC MATERIAL

Hygiene museum interest in different sections of the country was reported to the Governing Council by the Committee on American Museum of Hygiene of which Dr. Victor C. Heiser is chairman. The report will appear in the annual *Year Book* of the A.P.H.A.

"Puppetry Bulletin," for 1935–1936 is obtainable of Paul McPharlin, Birmingham, Mich. Enclose *3 cents* postage. Almost indispensable if you are interested in puppets or marionettes, with its addresses for supplies and equipment, mention of late books and pamphlets, and other current information.

"On Relief" is one of the best examples of American produced Dr. Neurath type of graphic presentation.

Prepared by Graphic Unit of the Research Section, Federal Emergency Relief Administration, Washington, D. C. There are 21 good sized charts, in two colors, with an explanatory statement of 50 to 125 words on the opposite page. Probably copies will be supplied by addressing Washington, or the director of the Graphic Unit, Rudolph Unit, Pictorial Statistics, 160 E. 36th St., New York, N. Y.

MAGAZINE ARTICLES

" Birth-control Debate Renewed." " Question, once furtive, now discussed in public hearings." *Literary Digest,* New York City. Dec. 14, 1935. *10 cents.*

" Colds and Where to Catch Them," by F. S. Bigelow. *Saturday Evening Post,* Philadelphia, Pa. Nov. 30, 1935.

" Give Your Brain a Chance," by Dr. C. W. Sawyer. " Science and common sense have taken much of the mystery from insanity." *Rotarian,* 35 E. Wacker Drive, Chicago, Ill. Jan., 1936. *25 cents.*

" The Robinsons' Dog Has Rabies," by S. J. Crumbine. *National Parent-Teacher Magazine,* 1201 16th St., Washington, D. C. Jan., 1936. *15 cents.* " The Robinsons took a chance in not taking it more seriously when their pet began to act queerly."

" Someone Must Pay," by J. Frampton. " Home Safety " (editorial). *Kiwanis Magazine,* 520 N. Michigan Ave., Chicago, Ill. Dec., 1935. *15 cents.*

" That New Baby," by Dr. W. R. Ramsey. *Farmer's Wife,* St. Paul, Minn. Dec., 1935.

" The Truth About Colds," by J. W. Ephraim. *American Mercury,* 570 Lexington Ave., New York City. Jan., 1936. *50 cents.*

MOTION PICTURES

" Adapting Animation " and " New Wrinkles on Newsreels " are two articles for the amateurs who wish to make fuller use of the technic available. *Movie Makers.* Amateur Cinema League, 105 W. 40th St., New York, N. Y. Jan., 1936. *25 cents.*

" Films for Theatres, Clubs, Schools and Other Organizations." A new descriptive list of movies and film strips offered by Metropolitan Life Insurance Co., 1 Madison Ave., New York, N. Y.

From American Social Hygiene Assn., 50 W. 50th St., New York, N. Y., comes this announcement:

> Three-reel talking film, Science and Modern Medicine, prepared by a special committee of the association to accompany the drama, Damaged Lives, may now be had for non-commercial showings separately from the drama. The film deals with the process of human reproduction and with the so-called venereal diseases—syphilis and gonorrhea—and their effects on individual health and family life.
>
> Both 35mm and 16mm are sold or rented.
>
> Ask for free booklet, A Three Point Program in Health Education, Pub. No. 852, which gives scenario and text, and outlines of the Special Series of pamphlets prepared by Dr. William F. Snow, Health for Man and Boy, Women and Their Health and Marriage and Parenthood, which are recommended to supplement this film. These may be secured for *15 cents* per set.

NEW

Hospitals, to succeed *Bulletin,* American Hospital Assn., 18 E. Division St., Chicago, Ill. An extensive professional journal, 11½ by 8½ inches, 136 pages. No subscription price given.

RADIO

The Department of Health, New York City, is now broadcasting according to the following schedule:

Monday, 2:45 p.m., WNYC
Tuesday, 2:15 p.m., WVFW
Wednesday, 10:45 a.m., WARD
Wednesday, 12:00 p.m., WNYC
Wednesday, 4:30 p.m., WBNX
Thursday, 3:30 p.m., WRAD
Friday, 9:45 a.m., WINS

Recent broadcasts by several state and city departments are listed below.

Baltimore City Health Dept. (auspices of Medical and Chirurgical Faculty of Maryland):

Our city's health and the Community Fund. . . . Crippled hearing. . . . Children who eat paint. . . . Some common dangers in the home. . . . The relationship between the City Health Department and the Department of Public Welfare. . . . Tuberculosis is everybody's business. . . . Why little Mary won't eat. . . . Preventive dentistry. . . . Tularemia. . . . Santa and good health. . . . Dr. Kelly speaks on radium and X-ray. . . . Common sense at Christmas time. . . . Taking Lord Baltimore's pulse (health survey).

Connecticut State Department of Health (by different staff members):

Keep your garage doors open. . . . Mental hygiene makes progress in Connecticut. . . . The septic tank. . . . Making ice cream a safe food. . . . Guarding the health of future generations. . . . The public health nurse's place in the community health program. . . . Emotions under control. . . . The state of our health.

Illinois State Dept. of Public Health (given by Dr. C. W. Chamberlain, Division of Communicable Diseases):

Over-weight and disease resistance. . . . Wars and rumors of wars (wounds and disease). . . . A soldier of fortune (Louis J. Cantor). . . . Newer knowledge of disease resistance and physical differences in mankind. . . . They call them accidents (in the home). . . . The new doctor diathermy. . . . Highway hysteria. . . . Privileges and perversities of the poor pedestrian. . . . A health officer looks at Ethiopia. . . . Can the newer generation face the facts? . . . Is this the most common disease in America? (sinus trouble). . . . Physical activity and disease resistance. . . . The big bad wolf—superstition. . . . You don't believe in doctors? . . . Babies, burns, blisters, and brews. . . . Lending nature a helping hand. . . . Hear ye! Hear ye! (hearing). . . . More martyrs in medicine. . . . Newer approach to speech defects.

Ohio State Department of Health:

Tuberculosis control and the school child. . . . Maternal and child hygiene program under the Social Security Act. . . . Carbon-monoxide poisoning. . . . The school nurse. . . . Just teeth. . . . What have you on deposit in your heart bank? . . . Epidemic meningitis. . . . Diphtheria.

CHILDREN AND SCHOOLS

"A Project in Rural School Health Education," by Ruth E. Grout. Reprint from *Milbank Memorial Fund Quarterly Bulletin.* Includes "Initiating the Study," "Building the Program," "Unit Teaching," "Relationships With Community Health Programs," and "Home-School Relationships."

"The School Doctor States His Case (the school, the home, and the community share responsibility for the protection of child health)," by Harold H. Mitchell, M.D. "Turning the Light on School Lighting," by Hugh G. Rowell, M.D. *National Parent-Teacher Magazine,* 1201 16th St., N. W., Washington, D. C. Dec., 1935. *15 cents.*

Health Bulletin for Teachers, School Health Bureau, Metropolitan Life Insurance Co., New York, N. Y. The 1935–1936 issues will be devoted to "the Conquest of Disease," the primary aim being

To tell in simple and dramatic form the story of the conquest of certain typical plagues of mankind. The affections have been selected to illustrate various types of disease (communicable, constitutional, dietary, mental) and to illustrate the biological, geographical, and socio-economic factors contributing to their control. Practical applications and limitations of present knowledge will be appropriately emphasized.

BOOKS AND REPORTS

The Pneumonokonioses (Silicosis): Literature and Laws of 1934 —*By G. G. Davis, E. M. Salmonsen, and J. L. Earlywine. Chicago: Chicago Medical Press,* 1935. 490 pp. Price, $10.00.

The present compilation of references on one of the most important occupational diseases—silicosis—is the second volume of a series. The first volume contained a bibliography of nearly 3,000 references dating from 1556 to 1933, inclusive. The present volume, including all the publications on the subject issued during the year 1934, has the added advantage of presenting a brief abstract of each article. The book is made up of two parts, the Abstracts and the Laws: the Abstracts are followed by an Authors' Index and a Subject Index. In addition, certain references omitted in Book I are included in this new edition.

In the reviewer's opinion, many of the newspaper accounts included in the book could very well have been left out, thereby giving a more scientific aspect to the volume. Personally, the reviewer would rather that the references were arranged according to subject matter instead of the alphabetical treatment presented. Thus, a reader who is interested only in the pathology of asbestos dust inhalation would find all the articles on this subject listed in one place.

These suggestions are offered for consideration should additional volumes on this subject be in progress, and are not meant to detract in any manner from the value of this book to students of dust inhalation. Indeed, the authors are to be congratulated for their courage and perseverance in undertaking the difficult task of compiling the two books issued to date. Both volumes should prove to be extremely useful to students of this occupational disease.

R. R. SAYERS

Industrial Medicine—*By W. Irving Clark and Philip Drinker. New York: National Medical Book Co.,* 1935. 262 pp. Price, $3.00.

This book which is one of a series of monographs, proposes to clarify the knowledge of the general practitioner in regard to what industrial medicine is and to inform him of standard practice in this field.

The first part of the book is disappointing in that it does not adequately cover its field. It is not broad enough for a text and is too broad for concise expression. We cannot agree with the authors for example, that the limited discussion of fractures, injuries, and sprains has a place in a book of this type, for any surgeon knows more about these conditions than can be learned here. Nor do we believe that physicians in industry will care to share the responsibility of caring for the general practitioner's private patients by doing laboratory and other technical work for him. This can easily constitute interference with the patient's own physician and divided responsibility for any patient is undesirable. The chapters on organization are not comprehensive enough to be of universal value.

That portion of the book which deals with the occupational diseases more than compensates for any faults that may exist elsewhere. The chapters on pneumoconiosis are excellently and clearly written, and describe in an understandable manner an inherent disease of industry about which little

is known by the profession in general.

The concise presentations of other occupational diseases and methods for their prevention make the book valuable for reference. The extensive bibliography is especially valuable in this connection. The book is well indexed but the illustrations are of little consequence except those in the chapters on pneumoconiosis.

We believe it a worth while addition to any medical library.

D. B. LOWE and W. C. ARTHUR

Sanitation and Health Standards for Summer Camps—*By E. B. Buchanan, M.A.; R. J. Ochsner, M.D. Published by the Anti-Tuberculosis League of Cleveland and Cuyahoga County, 1601 Builders' Exchange Building, Cleveland, Ohio.* 55 pp.

This is an excellent mimeographed manual of great practical value. It is based on many years of experience in handling camps and camp sanitation in the Cleveland area.

It covers such items as choice of grounds, toilets, garbage disposal, kitchen sanitation, water supplies, bathing facilities, medical and nursing supervision, and fly and mosquito control.

Including, as it does, definite directions and sketches for the construction of camp sanitation facilities, it is a valuable practical treatise for those responsible for good health in camps. Any camp director would do well to have and study it.

CHARLES H. KEENE

Socialization of Medicine. *The Reference Shelf, Vol. 10, No. 5. Compiled by Julia E. Johnsen. New York: H. W. Wilson Company,* 1935. 335 pp. Price, $.90.

We may expect a number of books such as this on the general subject which it discusses. The introduction shows that the compiler has consulted the report of the Committee on the Costs of Medical Care. She speaks of the majority report, and one minority report, though there were 2 of the latter.

The book opens with a Brief stating the question and summarizing the affirmative and negative sides. This we think is well done. Following this there are some 42 pages of bibliography. Some of the authors quoted are entitled to speak on account of their mentality and training. Just why others have been quoted, it is difficult to understand. The same thing may be said of the extracts which are given further on.

As a source book for those who are sufficiently in touch with the subject to judge of the value of the material presented and the qualifications of the authors quoted, it can be recommended. The subject is being discussed by all sorts of people, sociologists, philanthropists, doctors, etc. Unfortunately, a popular subject always attracts a number of people who like to be on the top of any wave of popularity.

MAZŸCK P. RAVENEL

National Medical Monographs—*Edited by Morris Fishbein, M.D. New York: National Medical Book Co. Vol. 1. Abnormal Arterial Tension—By Edward J. Stieglitz, M.S., M.D., F.A.C.P.,* 1935. 261 pp. Price, $3.00. *Vol. 2. Diseases of the Chest—By J. Arthur Myers, M.D.,* 1935. 385 pp. Price, $3.00. *Vol. 3. Commoner Diseases of the Skin—By S. William Becker, M.S., M.D.,* 1935. 283 pp.

Following a detailed table of contents, the author assembles his material in 16 chapters, illustrated by 66 figures, many of which are X-ray halftones, with a brief preface and quite adequate index. References are footnoted on the given page.

The subject falls into 4 general

phases—the normal vascular tension and its mechanism, the hypertensive, the hypotensive, and the relations to surgery and pregnancy. The public health worker will be especially interested in the chapters and discussion referring to etiology, prophylaxis, prognosis, and control-therapy. The early symptomless character of abnormal arterial tension, usually accompanied by a sense of well-being, and the great importance of recognition, in this stage, for proper control, emphasize the importance of periodic physical examinations and of preventive medicine which the author considers to be a purely individual problem—that is, one between the individual and his physician. Of significance are long continued mental fatigue, argumentative moods, tense play, cold and the "meal" effects, to say nothing of climate, race, physique, pregnancy, obesity, posture, infections, etc., and a legion of irritants and stimulants (and lack of same) which affect the muscles of the arterioles, constituting the underlying cause.

Such a thing as *idiopathic* or *essential* hypertension does not exist—a cause, perhaps more than one, always exists, and is quite invariably discoverable in the given case. Interesting tables classify these causes. A chart shows the causation of hypertensive arterial disease due to lead poisoning; another, the mechanism by which irritants finally produce arteriolar-sclerosis; etc. The hypertensive personality—the typical American—is a fine discussion. The nature and technic of tests are amply discussed.

We note a paucity of specific discussion on nutritional, *i.e.*, dietary, prophylaxis and therapy, though it is emphasized that the condition must be essentially a disturbance in nutrition. Perhaps the negative remark about the value of iodides and certain mineral elements (page 169) dismisses too lightly the relation of these elements to metabolism and the fundamental etiology. A special index summarizing references would no doubt have added to the usefulness of the volume, as appears in Clark and Drinker's *Industrial Medicine*, another of the monographs.

In summary, we have here a very readable and scientific text logically arranged with sub-heads, and covering a most momentous question in personal and public health.

In *Volume 2*, beginning with a detailed table of contents, the author assembles his material in 19 chapters, illustrated by 62 figures, mostly X-ray chest half-tones, with a brief preface and a combined index of authors and subject material. It has not been the purpose to cover the heart and thoracic vascular system. Part I covers the first infection type of tuberculosis (pathogenesis, tuberculin test, bronchoscopic and X-ray diagnosis, examination and classification, treatment, prognosis and preventives); Part II, reinfection type (establishment, acute and chronic types, management, artificial pneumothorax, operations and the magnitude of the tuberculosis problem); and Part III, non-tuberculous chest diseases (pneumonia, suppurative conditions, tumors, mishaps, moulds and yeast-like diseases, and pneumoconiosis). Each chapter ends with a summary and a list of references.

Public health workers having aught to do with pulmonary tuberculosis and its prophylaxis and management, including tests, accepted classifications, complications, and differential diagnosis, will find this a well balanced and valuable book written in clear-cut and convincing style. The same may be said for the non-tuberculous lesions such as those due to mould fungi, and the especially fine chapter on Diseases and Conditions Caused by the Inhalation of Dust, although in the latter possibly not enough space has been

given to the rapidly accumulating evidence that tuberculous involvement is difficult to substantiate in human cases of silicosis. Residual lesions and possible complications from the inhalation of irritant gases; and, in fact, the general subject of environmental predisposing and modifying factors, other than infestations and dust, are omitted. Hence, the stress of the presentation falls upon pathogenesis, diagnosis and clinical and surgical procedures, although the special chapter upon the magnitude of the tuberculosis problem recognizes the educational, economic and coöperative steps essential to the control of this disease.

In *Volume 3*, a brief preface points out that dermatology has passed through three eras: the *internist* (or internal factors) of the French school, the *externist* (or environmental factors) of the Viennese school, and the *bacterial*. The dawning era is the *biologic*. Man of all animals is the victim of dermatoses. The functional viewpoint and the lecture style are assumed in the present work. The volume comprises 26 chapters and 82 figures (all but 2, half-tones of skin conditions). There is no bibliography. The index comprises chiefly causal agents and subjects occurring in chapter sub-headings.

The work is preëminently one for the general practitioner of medicine who is being instructed by a specialist for the purpose of assisting him in his daily visitation by patients with all manners of skin and scalp troubles—a valuable *vade mecum* from etiology through diagnosis to therapy, including formulary. Outside of brief remarks upon the care of the skin and scalp, certain toxic and drug eruptions, and a half-a-dozen pages under the caption of The Skin in Industry, devoted chiefly to the rarer conditions, the work is quite beyond the average lay reader, as no doubt it should be. It should fill a definite need for the physician who wishes an up-to-date guide in the shape of a medium sized text, which is comprehensive and commendably free of verbosity. EMERY R. HAYHURST

Know Thyself: A Study in Mental Qualities—*By John Potts, M.D., D.C.L. Philadelphia: Dorrance,* 1935. Price, $3.00. 267 pp.

A philosophy of practical values and a study of the mind in action are here united in a plan for effective living which may be daily verified by observation of oneself and others. The simplicity of the language and the engaging style of the author make the book intelligible to the average man for whom it is written, while its unusual method of presentation and the subtile utilization of indirect suggestion might almost be said to guarantee its assimilation by the thoughtful reader.

The first 20 pages of the book are devoted to "The Problem," which is defined as the study, by the layman, of mental qualities of himself and others, with particular emphasis upon those qualities most to be desired. The last 23 pages are entitled "Progress," and are summed up in the concluding sentence of the book:

> A person who recognizes the mental qualities of men, women and children; who is intelligent enough to know what his social attitude, his duty, and his responsibility, if any, toward them should be, has acquired useful knowledge that will help him daily to pass through life with the maximum amount of pleasure and the minimum amount of grief.

"The Study," which comprises the remainder of the book, consists entirely of the 100 rules or observations on what constitutes *superior mentality,* together with the author's comments upon them. They reflect, he says, his experiences with people and his reading over years of time. A sampling of the rules will serve to indi-

cate their nature and variety, although it can give little idea of the penetrating wisdom of the discussion:

1. Persons having superior mentality have ability to see and to solve problems.
52. The social attitude of the superior mind is altruistic rather than indifferent, parasitic, or misanthropic.
100. The good mind has both will and ability to learn. In addition to these the great mind has great capacity for learning.

The author is to be congratulated on an outstanding contribution to the literature dealing with successful living, so much of which is of questionable value. The book is recommended to all "workers with men" for their personal enjoyment and profit and as an excellent volume to place in the hands of those who would increase their knowledge of themselves and achieve more happy, useful lives.

FREDERICK W. BROWN

A Geography of Disease: A Preliminary Survey of the Incidence and Distribution of Tropical and Certain Other Diseases—*By Earl Baldwin McKinley, M.D. Washington: George Washington University Press*, 1935. *Published as a supplement to the American Journal of Tropical Medicine.* 495 pp. Price, $5.00.

This preliminary survey of the incidence and distribution of so-called tropical diseases and certain other preventable diseases was prepared by Dr. McKinley as director of studies, with the coöperation of an advisory committee consisting of Frederick P. Gay, Richard P. Strong, and Theobald Smith, under the auspices of the Division of Medical Sciences of the National Research Council, and with the financial assistance of the American Leprosy Foundation. The object of the survey was to meet the growing need for more specific information concerning these diseases throughout the world. Data are presented from 15 of our southern states, and from nearly all the tropical and subtropical countries of the world. The collection of such information must necessarily have been extremely difficult in view of the fact that there exists no uniform method of recording or reporting the incidence of diseases in different countries, especially in those countries where tropical diseases are most prevalent, and where medical service and public health administration are in many cases poorly developed. The author and the committee are to be congratulated upon their courage and vision in attempting such a study.

The data were collected by means of a questionnaire sent to responsible authorities and by a study of official health reports. The results are given in the form of tables listing the presence or absence of individual diseases in each country now or previously; the distribution and approximate number of cases of each disease; the presence or absence of the vector, if any; and a statement as to whether the disease is considered an important health problem. Preceding the statistical material for each country is a brief statement concerning the geography, population, financial resources, principal products, climatic conditions, and special disease problems. Following the statistical section of the book is a series of summaries of selected tropical diseases with short articles by well known authorities concerning the problems involved in the control of these diseases. Finally, there is an appendix which records other interesting information which was not suitable for inclusion in the main body of the book.

The difficulty of obtaining uniformly accurate information either by a questionnaire or from official reports is evident from the statistical material presented. In many cases it

was necessary to supplement the answers to the questionnaires by an examination of the annual reports of health departments. Some of the tabular data cover definite periods of time, usually 1 or 2 years, while in other cases only the date of the filling out of the questionnaire is given. The reports used to supplement the questionnaire apparently varied widely in the amount of detail presented. In some cases these reports included all the mortality and morbidity statistics of the political unit concerned while others recorded only the statistics of the public health laboratory. This lack of uniformity in the source of data makes it impossible to compare with any degree of accuracy the incidence of diseases in different states or countries. Despite this defect the survey is valuable in giving a general idea of the distribution of diseases and pertinent data concerning the regions in which they occur.

It is obvious from the incompleteness of the data presented that there is a great need for a better and more uniform system of collecting morbidity statistics in this country and throughout the world. Practitioners must be induced to coöperate better in reporting diseases, and health departments must institute more accurate and uniform terminology. It is deplorable, for instance, that the species of malaria parasite is not more generally recorded, and that often no distinction is made between bacillary and amebic dysentery, nor the term amebiasis used to cover all conditions due to *E. histolytica*. It is to be hoped that this survey will help to stimulate this much desired improvement.

It is difficult to see how a survey of this kind could be made with any degree of completeness without the services of a large staff organized for the collection of morbidity statistics. Many national governments as well as the League of Nations already publish statistics on the incidence of a number of important diseases, but there is an increasing need for those organizations to devise methods whereby similar data may become available for all preventable diseases. If the present report can serve as a start for such an accomplishment it will have served a good purpose. It will serve as a valuable source of information to those interested in the distribution of the important diseases of warm countries and should indicate where such diseases can best be studied.

HENRY E. MELENEY

The Bacteriology of Typhoid, Salmonella, and Dysentery Infections and Carrier States—*By Leon C. Havens, M.D. Edited by Kenneth F. Maxcy, M.D. Foreword by Wilson G. Smillie, M.D. New York: The Commonwealth Fund. London: Humphrey Milford. Oxford University Press,* 1935. 172 pp. Price, $1.75.

Here is a book that summarizes knowledge gained through years of practical experience in the specialized and complicated field of the enteric diseases and sets this against a theoretical background gained by intensive reading and study. No bacteriologist in this country has had more actual laboratory experience with this group of bacteria than Dr. Havens, who served for 11 years as Director of the several Alabama State Laboratories in a territory where the endemic incidence of diseases of this group is particularly high. Few bacteriologists have specialized in the literature of this field to the same extent as Dr. Havens, as evidenced by his analytical discussions of the claims of various investigators found scattered throughout the book, and by the extensive bibliography appended to each chapter. From this rare combination there emerges this text which is more than

a guide to the bacteriology of the group—it is a guide to clear thinking regarding the problems presented by these organisms.

Thirteen chapters comprise the book, of which the first 3 deal with general aspects of the bacteriology of the group. Here is an excellent discussion of the antigenic composition of the cell and of bacterial variation as it affects physiological and serological characteristics of the various organisms. The explanation of the "diphasic" phenomenon and of the somatic changes in antigenic composition are illustrated by excellent, clear-cut, and yet simple, drawings. Five chapters deal with laboratory methods and, while Dr. Havens naturally favors those he developed and used so successfully in his years of work, he does not present them alone but offers alternative ones and in many instances presents tables of comparative results. He devotes 2 chapters each to a consideration of the 3 groups: Typhoid fever, Salmonella, and Dysentery, with special reference to the correlation of laboratory findings with clinical and epidemiological facts. The typhoid carrier problem is discussed and a plan presented for the organization and management of carrier surveys. His discussion of the classification and nomenclature of the Salmonella group is exceptionally clear and illuminating, as is his presentation of the antigenic relationships of the various strains of dysentery bacilli.

The book is attractively printed and arranged, reflecting the excellent editing of Dr. Maxcy. A short summary is presented at the end of each chapter. It should have a wide circulation not only among laboratory workers and investigators but also in the classroom and among those administrators and epidemiologists who are called upon to interpret the results of laboratory studies in these diseases.

In studying this book one cannot but feel how unfortunate it is that the brilliant brain of Leon C. Havens had to be stilled by his untimely death at the age of 41 years. EDMUND K. KLINE

BOOKS RECEIVED

THE PATIENT AND THE WEATHER. Vol. I, Part I. By William F. Petersen. Ann Arbor: Edwards Brothers, 1935. 127 pp. Price, $3.75.

MANSON'S TROPICAL DISEASES. 10th ed. Edited by Philip H. Manson-Bahr. Baltimore: Wood, 1936. 1003 pp. Price, $11.00.

THE ART OF LEADERSHIP. By Ordway Tead. New York: McGraw-Hill, 1935. 308 pp. Price, $2.50.

THE SANITARY INSPECTOR'S HANDBOOK. 2d ed. By Henry H. Clay. London: Lewis, 1936. 432 pp. Price, $4.75.

DON'T BE AFRAID. By Grace Adams. New York: Covici-Friede, 1935. 188 pp. Price, $2.00.

HEALTHFUL LIVING. By Harold S. Diehl. New York: McGraw-Hill, 1935. 354 pp. Price, $2.50.

CONVALESCENT CARE IN GREAT BRITAIN. By Elizabeth Greene Gardiner. Chicago: University of Chicago Press, 1935. 163 pp. Price, $1.50.

MAN, THE UNKNOWN. By Alexis Carrell. New York: Harper, 1935. 346 pp. Price, $3.50.

HEALTH AND HUMAN PROGRESS. By Rene Sand. New York: Macmillan, 1936. 278 pp. Price, $3.00.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

For the Treatment of Pneumonia—Studies in typing and treating pneumococcic pneumonias carried on by the Massachusetts State Health Department, and a review of modern methods for attacking the vexing pneumonia problem are described in non-technical language.

ANDERSON, G. W., and HEFFRON, R. Present Status of Pneumonia Problem. Pub. Health Nurs. 27, 12:633 (Dec.), 1935.

Food, Hormones and Sunlight—In this series of lectures on nutrition the author describes, among other studies, the examination of infant excreta to determine how much of various foods added to the infant's diet are absorbed. This work may have been done in this country too, but, if so, it has not been reported in the journals most health workers see.

ARMAND-DELILLE, P. Problems of Nutrition and Growth. J. State Med. 43, 12:683 (Dec.), 1935.

The Right to Marry—Beginning with this year, Connecticut couples may not obtain a marriage license until they obtain a medical certificate indicating freedom from syphilis.

BURGDOFF, A. L. Social Significance of the New Marriage Law. Connecticut Health Bull. 49, 11:247 (Nov.), 1935.

Influenza Epidemiology—Ten influenza outbreaks occurring during the past 15 years are studied and the progress recorded in graphs.

COLLINS, S. D., and GOVER, M. Influenza and Pneumonia Mortality in a Group of about 95 Cities in the United States during Four Minor Epidemics 1930–35 with a Summary for 1920–35. Pub. Health Rep. 50, 48:1668 (Nov. 29), 1935.

About Cancer Causes—Though this brief summary of existing beliefs and disbeliefs in regard to the many causes of cancer is labeled "partial," it seems really inclusive. Health workers generally would profit by a close reading of this easily understood survey which urges more detailed clinical study of cases.

CRAVER, L. F. Etiology of Cancer. J.A.M.A. 105, 23:1820 (Dec. 7), 1935.

Safeguarding Ice Cream Manufacture—Food poisoning on shipboard from ice cream made with preserved chestnuts was studied. *Staphylococcus aureus* probably was the causative organism, and insanitary practices in preparing the food were probably to blame.

GEIGER, J. C., *et al.* Food Poisoning from Ice Cream on Ships. J.A.M.A. 105, 24:1981 (Dec. 14), 1935.

Undulant Fever and Raw Milk—Evidence is presented indicating that an outbreak of undulant fever was caused by drinking raw milk from diseased cows which were infected with the strain from swine.

HORNING, B. G. Outbreak of Undulant Fever Due to Brucella Suis. J.A.M.A. 105, 24:1979 (Dec. 14), 1935.

Why Syphilis Is Not Stopped—All the deficiencies in public health preventive measures against syphilis are set down in 1-2-3 order and the chips are allowed to fall where they may. All administrators should read this.

STOKES, J. H. The Public, the Doctor, and the Syphilis Problem. J. Social Hyg. 21, 7–8–9:313 (Oct.-Dec.), 1935.

Evidence for Poliomyelitis Vaccine—Steps leading to the trial of attenuated poliomyelitis virus upon human beings and the record to date are described in absorbing detail.

KOLMER, J. A. Susceptibility and Immunity. J.A.M.A. 105, 24:1957 (Dec. 14), 1935.

Against Poliomyelitis Prophylaxis—A round dozen cases of poliomyelitis occurring 6 to 14 days after the injection of poliomyelitis virus, none of the patients being in epidemic areas or known to have been exposed, would appear to make further immunizations unwise.

LEAKE, J. P. Poliomyelitis Following Vaccination against the Disease. J.A.M.A. 105, *26:2152* (Dec. *28*), 1935.

A Farm Editor Looks at Rural Health—Seeing our larger jobs as others see them is a wholesome experience. The hits, runs, and errors of rural public health and medicine in the United States and Canada are chalked up by an unprejudiced critic for all to observe.

STREETER, C. P. Reorganizing Rural Health Facilities. Pub. Health Nurs. 27, 12:638 (Dec.), 1935.

Sugar and Nutrition—When at the beginning this paper indicated its concern with the dangers of sugar in the diet, a silent bet was made that cancer would be dragged in before the score was completed. Sure enough, one authority quoted suspected sugar of being a possible cause of hypertension and arteriosclerosis, as well as cancer. According to the statistics given as of 1928, United States did not stand first in per capita consumption of sugar; three other countries exceeded it.

WALLACE, W. H. S. The Place of Sugar in the National Diet. Pub. Health, 49, 3:84 (Dec.), 1935.

ASSOCIATION NEWS

PROFESSIONAL EDUCATION

THE Professional Education Committee of the American Public Health Association under the chairmanship of W. S. Leathers, M.D., of Nashville, Tenn., met in New York on January 4, with a complete attendance of the members and good representation from sub-committees interested in several of the schedules under consideration for health department personnel.

New members of the committee who were present included Henry F. Vaughan, Dr.P.H., of Detroit, and Stanley H. Osborn, M.D., of Hartford, Conn.

The entire day was spent in formulating broad policies for Association activities, several progress reports being received from sub-committees for later consideration and editorial revision by a special committee. Consideration of the qualifications of health officers was deferred for a later meeting.

THE NEW MEMBERSHIP APPLICATION BLANK

THE discontinuance of the associate membership grade necessitated the printing of new membership application blanks. The new form is a decided improvement over the old one in that it provides for more information qualifying the applicant for election to membership.

Please give the new form the welcome it deserves by writing to the central office for a copy and handing it to some coworker who is not yet a member of the American Public Health Association.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

R. D. Dedwylder, M.D., Cleveland, Miss., Director, Bolivar County Health Dept.

Frank C. Diver, M.D., Raton, N. Mex., District Health Officer

James N. Dudley, M.D., Henrico County Health Dept., Richmond, Va., Health Officer

Thomas H. D. Griffitts, M.D., D.P.H., State Board of Health Bldg., Jacksonville, Fla., Surgeon, U. S. Public Health Service

Frances A. Kenyon, M.D., Woodrille, R. I., Health Officer

Stanley Mattmiller, 226 Chestnut St., St. Marys, Pa., County Health Officer

Lester F. Meloney, M.D., 156 Second St., Clifton, N. J., Health Officer

Laboratory Section

Ruth M. Cowdell, Box 1139, Hartford, Conn., Senior Assistant Serologist, State Dept. of Health

Robert A. Greene, Ph.D., P. O. Box 4694, Tucson, Ariz., Director, Arizona State Laboratories

John J. Phair, M.D., C.P.H., State Board of Health, Jacksonville, Fla., Acting Director, State Laboratory

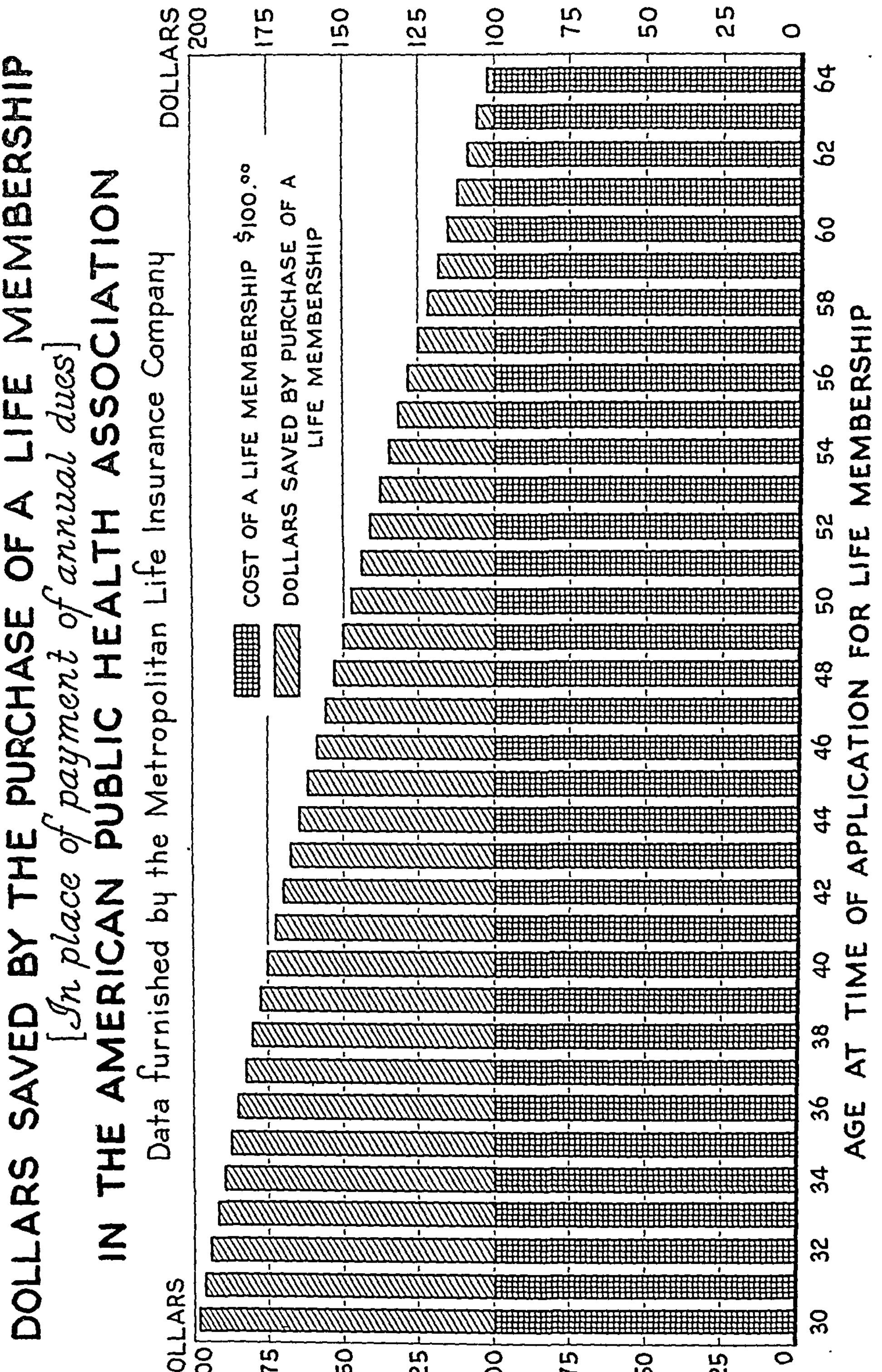
Vernon L. Turgasen, 8015 Carpenter St., Chicago, Ill., Quality Supervisor, Armour & Co.

Seth T. Walton, V.M.D., Ph.D., City Health Dept., Charlotte, N. C., Director of Laboratories and Research

Public Health Engineering Section

Milton H. Bidwell, B.S., 171 Evans Ave., Freeport, L. I., N. Y., Bacteriologist, Sanitary Control of Shellfish

Edwin D. Cushman, M.S.P.H., 1113 Grant


DOLLARS SAVED BY THE PURCHASE OF A LIFE MEMBERSHIP
[In place of payment of annual dues]
IN THE AMERICAN PUBLIC HEALTH ASSOCIATION
Data furnished by the Metropolitan Life Insurance Company
COST OF A LIFE MEMBERSHIP $100.00
DOLLARS SAVED BY PURCHASE OF A LIFE MEMBERSHIP
DOLLARS
200
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AGE AT TIME OF APPLICATION FOR LIFE MEMBERSHIP

St., Ypsilanti, Mich., Sanitary Inspector, Genesee County Health Dept.

Herbert C. Dyktor, St. Louis Health Dept., St. Louis, Mo., Sanitary Engineer, Milk Control Service

Martin A. Pond, B.S., 94 Ardmore St., Hamden, Conn., Student in Public Health at Yale University

Industrial Hygiene Section

Arthur S. Johnson, S.B., 142 Berkeley St., Boston, Mass., Assistant to the Manager, Engineering Dept., American Mutual Liability Insurance Company

Paul A. Neal, M.D., U. S. Public Health Service, Washington, D. C., Passed Assistant Surgeon, Office of Industrial Hygiene and Sanitation

Vital Statistics Section

Lidie C. Venn, A.B., 39 Lynwood Place, New Haven, Conn., Fellow of National Tuberculosis Assn.

Food and Nutrition Section

Abraham E. Abrahamson, Ph.G., 200 E. 16 St., New York, N. Y., Inspector of Foods, Dept. of Health

Charles F. Church, M.D., 4025 Huey Ave., Drexel Hill, Pa., Research in Nutrition, School of Medicine, University of Pennsylvania

Herman W. Erde, B.S., 415 Ditmas Ave., Brooklyn, N. Y., Supervising Inspector of Foods, New York City Dept. of Health

J. A. Keenan, Ph.D., Wisconsin Research Foundation, Madison, Wis.

Captain Michael Shipley, D.V.M., 1601 N. Ballinger St., Fort Worth, Tex., Veterinary Officer, U. S. Army

Child Hygiene Section

Joyce I. Hartman, M.D., Board of Education, Cleveland, O., Directing Supervisor, Medical Service, City Public Schools

Guy N. Magness, M.D., 6701 Delmar, University City, Mo., School Physician, City Public School

Public Health Education Section

Mrs. Ernest R. Grant, Hay-Adams House, Washington, D. C., Managing Director, District of Columbia Tuberculosis Assn.

Sister Marie, R.N., Regis College, Weston, Mass.

Marion Simonson, R.N., 353 W. 57 St., New York, N. Y., Field Adviser in Public Health, State Committee on Tuberculosis and Public Health

Public Health Nursing Section

Gladys A. Adams, R.N., 226 E. Fordham Rd., Bronx, N. Y., Executive Secretary, Bronx Tuberculosis and Health Committee

Lena Gaudet, R.N., 170 Elm St., Amesbury, Mass., Public Health Nurse

Anna R. Moore, R.N., 1410 Alaska Bldg., Seattle, Wash., State Advisory Public Health Nurse

Hilga S. Nelson, 297 Walnut St., Newtonville, Mass., Executive Director, District Nursing Assn.

Johanna L. Sogaard, State Board of Health, Jacksonville, Fla., District Supervisor of Nurses

Olive M. Whitlock, R.N., 816 Oregon Bldg., Portland, Ore., State Advisory Nurse

Epidemiology Section

Harold E. Miner, M.D., 65 Columbus Ave., Holyoke, Mass., District State Health Officer

NEWS FROM THE FIELD

DR. PARK RETIRES

DR. WILLIAM HALLOCK PARK, F.A.P.H.A., ex-President of the Association, noted bacteriologist and hygienist, retired on his 72nd birthday anniversary, December 29, from his position as Director of the Bureau of Laboratories of the Department of Health, New York City, the position which he has held for the last 41 years. This announcement was made by Dr. John L. Rice, Commissioner of Health, on December 26.

Under this arrangement Dr. Park will take a 6 months' vacation, after which he will retire permanently from the directorship and become Director-Emeritus of the Bureau. The new William H. Park Research Laboratories named in his honor are expected to be completed within a few months so that they can be dedicated while Dr. Park is still in the city's service. He will continue to work in the laboratory in an advisory capacity.

The new Acting Associate Director, Dr. Ralph Muckenfuss, member A.P.H.A., will be in charge during Dr. Park's absence.

As Professor of Bacteriology and Hygiene at the University and Bellevue Hospital Medical College since 1897, Dr. Park has been an active contributor in the field of public health. Among his connections he has been consulting bacteriologist and medical examiner in bacteriology for the New York State Department of Health and has been consulting bacteriologist for the U. S. Quarantine Service. He was president of the American Public Health Association in 1924 and has been vice-president of the New York Academy of Medicine. He has been widely honored for his researches in preventive medicine, with particular reference to diphtheria, tuberculosis, and poliomyelitis.

PSITTACOSIS VICTIM

A RECENT report from San Francisco states that Karl F. Meyer, M.D., F.A.P.H.A., head of the Hooper Foundation of the University of California, is recovering from psittacosis, which he contracted two months ago while engaged in extensive experiments to check the spread of the disease.

DR. CLARK RECEIVES MEDAL

THE American Chemical Society, New York Section, has announced that the William H. Nichols Medal, a highly prized honor, has been awarded to Dr. William Mansfield Clark, Professor of Physiological Chemistry at Johns Hopkins University School of Medicine, for 1936, "for researches of incalculable value to human welfare."

The medal will be presented to Professor Clark at a dinner meeting of the New York Section on March 6, when Dr. D. D. Van Slyke of the Rockefeller Institute and Dr. A. Beard Hastings of the Harvard Medical School will discuss these achievements, following which Dr. Clark will deliver the annual Nichols Medal address. Among previous recipients of this medal were Dr. Irving Langmuir, Nobel prize winner in chemistry, and President James Bryant Conant of Harvard University.

Dr. Clark is a graduate of Williams College and received the degree of Ph.D. in chemistry from Johns Hopkins in 1909. From 1910 to 1920 he was research chemist with the Dairy

Division of the U. S. Department of Agriculture and from 1920 to 1927 he was associated with the U. S. Public Health Service as Professor of Chemistry and chief of the division at the Hygienic Laboratory.

HOSPITAL SURVEY OF NEW YORK CITY

A COMPREHENSIVE hospital survey for New York City has been organized under the direction of the United Hospital Fund of New York under a grant of $40,000 from the Carnegie Corporation. A general committee of 100 representative citizens has been chosen and the direction of the survey has been placed in a Study Committee under the chairmanship of Dr. George E. Vincent. Other prominent members of this committee are: Dr. S. S. Goldwater, Dr. Charles Gordon Heyd, Dr. John E. Jennings, Dr. Eugene H. Pool, Dr. Willard C. Rappleye and Dr. Nathan B. Van Etten. Dr. Haven Emerson, who has directed other major community hospital surveys, is the Director of the Study.

PLANS FOR CHILD HEALTH DAY

THE Conference of State and Provincial Health Authorities has assumed the responsibility previously carried by the American Child Health Association for Child Health Day plans. A permanent committee has been appointed to handle the matter. The Secretary of this Conference is A. J. Chesley, M.D., F.A.P.H.A., State Health Officer, St. Paul, Minn.

PENNSYLVANIA TUBERCULOSIS SOCIETY

THE Pennsylvania Tuberculosis Society will hold its annual meeting at Allentown, Pa., on February 26. Speakers will include Dr. Edith MacBride-Dexter, the Secretary of Health of Pennsylvania, and Professor C.-E. A. Winslow, of Yale University.

OHIO HEALTH CONFERENCE HELD

THE 16th Annual Conference of Health Commissioners with the Ohio State Department of Health was held in Columbus, O., Nov. 13–15.

Included among the guest speakers were: J. A. Myers, M.D., of Minneapolis, Minn., member A.P.H.A., on Tuberculosis; Eugene L. Bishop, M.D., of Knoxville, Tenn., F.A.P.H.A., on Health and Sanitation in the Tennessee Valley; Martha M. Eliot, M.D., of Washington, D. C., on Maternal and Child Health; John Collinson, M.D., Dr.P.H., of the U. S. Bureau of the Census, Washington, D. C., F.A.P.H.A., on Vital Statistics; and J. A. Doull, M.D., of Cleveland, O., F.A.P.H.A., on A Survey of the State Health Department.

IMMUNIZATION DRIVE IN IOWA

STATE and local health authorities in Polk County, Ia., are coöperating with parent-teacher associations and other agencies in a campaign to immunize children against diphtheria.

It has been decided to devote one month each year to this campaign. This year it began in November, and is being publicized by radio, newspapers, and speeches. Much of the educational work is being undertaken by the Des Moines Council of Parent-Teacher Associations.

PHYSICIANS' PLACEMENT BUREAU

THE American Association of School Physicians recently established a placement bureau to aid physicians meeting its qualifications to find desirable positions, and to recommend to educational institutions medical inspectors qualified to organize and administer an efficient program of health service and health education.

For information, write to the Director of the Bureau, Arville O. DeWeese, M.D., formerly president, Director of

Health and Physical Education, Kent State College, Kent, Ohio.

NEW HEALTH UNIT IN ALABAMA

THE establishment of the Henry County Health Department on a full-time basis brings the total number of these full-time units in Alabama to 56.

The new unit will begin functioning January 1.

WPA TUBERCULOSIS CAMPAIGN IN DISTRICT OF COLUMBIA

WITH $99,000 available from the Works Progress Administration, a campaign to eradicate tuberculosis in the District of Columbia has begun.

X-ray machines have been made available in the city of Washington for the taking of roentgenograms by means of the paper method. Physicians may refer patients either for an initial film or for a check on treatment, all the work to be done without cost to the patient.

RHODE ISLAND PUBLIC HEALTH ASSOCIATION INCORPORATED

ON January 7, 1936, the Rhode Island Public Health Association was incorporated under the laws of the state and held its first annual meeting. The first president elected was Dr. Edward A. McLaughlin, the State Director of Public Health of Providence.

GRADUATE STUDY ABROAD

THE Institute of International Education located at 2 West 45th Street, New York, has a publication, *Opportunities for Graduate Study Abroad Open to American Students*, which is available on request. The Institute also supplies pamphlets on fellowships and assistantships available in transatlantic countries, and a bulletin, *Fellowships and Scholarships Open to American Students for Study in Foreign Countries*, is available at a cost of 25 cents.

COSMETIC SAMPLES IN MAINE

COSMETIC manufacturers have filed approximately 2,500 samples of their varied products with the Department of Health and Welfare, Augusta, Me., in an effort to have their products salable under Maine's new cosmetic law, effective January 1. Cosmetics kept for unlawful sale or use are subject to forfeiture. The registration fee has been reduced from $1 to half that amount.—*Printers Ink*, Jan. 2, 1936.

DR. FLEXNER REAPPOINTED

ON January 6, Governor Herbert H. Lehman, of New York, reappointed Dr. Simon Flexner, of New York City, as Chairman of the State Public Health Council. Two new members to the Council were appointed, Dr. Clayton Greene of Buffalo and Dr. George Baehr of New York City. Dr. Herman G. Weiskotten, dean of the Syracuse University Medical School, was named to succeed Dr. Frederick F. Russell, formerly of Brooklyn, who resigned.

The Public Health Council of New York State is charged with the duty of formulating the New York State Sanitary Code.

MEXICAN ACADEMY OF MEDICINE ELECTS NEW OFFICERS

THE National Academy of Medicine of Mexico announces the following new officers, elected recently:

President—Dr. Gustavo Baz
Vice-president—Dr. Ignacio González Guzmán
Secretary (permanent) — Dr. Alfonso Pruneda
Secretary (annual)—Dr. Mario Quiñones
Treasurer—Dr. Manuel Martínez Báez

TVA HEALTH

EFFECTIVE January 1, the responsibilities of the Tennessee Valley Authority in Health, Sanitation, Medical and Safety are being administered through a newly established Division of Health and Medical Service under the direction of E. L. Bishop, M.D., F.A.P.H.A., as Director of Health.

In the past, these responsibilities have been discharged through three sections in two different divisions, but under the administration of a single division director, Dr. Floyd W. Reeves, who served as the administrative officer of both divisions. The new division was created at the suggestion of Dr. Reeves who is changing his status from that of an administrative officer to consultant, and safety was included because of its close functional relationship to the other services.

RED CROSS RECEIVES BEQUEST

UNDER the will of Mrs. Clara A. Hapgood Higgins Smith, the American Red Cross will receive $3,482,535, according to a statement disclosed on December 27 when the transfer tax appraisal was filed in the New York court. The Red Cross is the residuary legatee in the will.

Other bequests by Mrs. Smith, who was a resident of Allegany County, N. Y., included local hospitals, the New York State Charities Aid Association, the Stony Wold Sanitarium at Lake Kushaqua, N. Y., and the Association for Improving the Condition of the Poor, New York City.

BACTERIOLOGICAL AWARD

AN annual award of $1,000 will be made to a young man or woman for distinguished work in bacteriological research, it was announced at the closing session of the 37th Annual Meeting of the Society of American Bacteriologists in New York. A feature of the award, which is expected to become the principal American recognition of achievement in this field, is that it will be given only to research workers in college or university laboratories who are younger than 31.

The first winner will be announced at next year's meeting in Indianapolis. Recognition will be given to original work either in bacteriology or in immunology, and a group of scientific societies have been asked to share in its sponsorship. The American Association of Immunologists and the American Society for Experimental Pathology have already agreed to coöperate in selection of the winner. The prize has been guaranteed for the next 5 years by the Eli Lilly Company, biological manufacturers of Indianapolis.

CONNECTICUT CANCER STUDY

IT is stated that the Connecticut State Department of Health will soon begin a study of the mortality and the prevention and treatment of cancer, in accordance with an act passed by the last legislature at the recommendation of the State Medical Society.

The Bureau of Preventable Diseases will carry on the study, and Herbert F. Hirsche, of Hamden, Conn., member A.P.H.A., has been appointed Research Statistician for the work.

FULL-TIME UNIT IN INDIANA

THE first full-time county health department in Indiana has recently been set up in Lake County. The 1935 general assembly passed a law permitting the establishment of full-time county health units and the Lake County commissioners adopted a resolution setting up the new unit. In addition, provision was made for one sanitary inspector, one stenographer and clerk, and four public health nurses, all employed full time, effective January 1.

William D. Weis, M.D., of Crown Point, Ind., is Health Commissioner.

DENTAL DESENSITIZER

ALL dentists without restrictions may obtain the dental desensitizer which was discovered in the laboratories of the Columbia Dental School by Dr. Leroy L. Hartman. It will not be patented, Frederick Coykendall, chairman of the board of the university, has announced.

The desensitizer is a liquid applied to the dentin of the tooth, and is effective for more than twenty minutes.

Dr. Hartman's formula, which has been the goal of dental research since the practice of modern dentistry began, aids the science by lessening the pain that occurs in the preparation and filling of tooth cavities.

AWARD TO MRS. THOMPSON

AT its 61st annual meeting held on November 15, 1935, the New Jersey Health and Sanitary Association awarded to Mrs. Geraldine Livingston Thompson a certificate " in recognition of her outstanding accomplishment in promoting the welfare of the people of New Jersey through her interest and activity in public health and social welfare."

This annual award is given by the association in such a form that it attracts public notice to service rendered in public health and related fields.

PERSONALS

HANS ZINSSER, M.D., Sc.D., Fellow A.P.H.A., was named on January 8 to the new Charles Wilder Professorship of Bacteriology and Immunology in the Harvard Medical School, Boston, Mass.

DR. W. A. MCPHAUL has been appointed State Health Officer of Florida by Governor Sholtz. Dr. McPhaul has been full-time County Health Officer of Escambia County, Fla., for several years. He was formerly connected with the North Carolina State Board of Health and was Health Officer of Charlotte, N. C. Dr. McPhaul succeeds Dr. Henry Hanson, F.A.P.H.A.

NAOMI DEUTSCH, R.N., F.A.P.H.A., has been appointed Director of Public Health Nursing Activities of the Children's Bureau in Washington. Miss Deutsch goes from the University of California in Berkeley to act as consultant for the important public health nursing projects under the auspices of the Children's Bureau. She is chairman of the Public Health Nursing Section of the Association.

DR. FRANCES C. ROTHERT, member A.P.H.A., formerly of Hartford, Conn., has been appointed to the Children's Bureau, U. S. Department of Labor, with responsibility for a group of states in the southern portion of the United States.

DR. DORIS A. MURRAY, formerly of Rochester, N. Y., has been appointed to the Children's Bureau and will represent the Bureau in certain of the eastern states. Dr. Murray has been on the staffs of the Maryland State Department of Health and the Cattaraugus County Department of Health, N. Y.

DR. SARA DIETRICH, recently of the staff of the New York State Department of Health, has been appointed to the Children's Bureau, U. S. Department of Labor, to be in charge of a group of states in connection with the new Social Security program.

DR. ROBERT C. HOOD, formerly of Parkersburg, W. Va., has been appointed director of crippled children's work with the Children's Bureau, U. S. Department of Labor, Washington. Dr. Hood has for some years been in the practice of pediatrics in West Virginia.

DR. JOHN R. BRUCE, of Marshfield,

Mo., has been appointed Health Commissioner of Webster County. He formerly served as County Physician.

DR. RANSOM L. CARR, of Rose Hill, N. C., has been appointed Health Officer of Dublin County, to succeed Dr. Clarence H. White, of Kenansville, resigned.

DR. HERBERT D. CHAMBERLAIN, of McArthur, O., has been appointed Health Commissioner in charge of a new health unit in Vinton County.

DR. WILLIAM GROSSMANN, JR., of Petersburg, Va., has been appointed Assistant Epidemiologist in the Virginia State Department of Health.

DR. SHOCKLEY D. GARDNER, of South Boston, Va., has been appointed Health Officer of the Valley Health District, with headquarters in Harrisonburg.

DR. JAMES N. DUDLEY, of Danville, Va., has been appointed Director of the Henrico County Health District, with headquarters in Richmond.

DR. THOMAS B. PAYNE has been appointed Health Officer of Fredericksburg, Va., to succeed the late Dr. Justus Lee Cooke.

WILLIS C. BEASLEY, formerly of Johns Hopkins University, Baltimore, Md., is in Alabama, establishing headquarters for 4 states now being studied in the national survey of health conducted by the U. S. Public Health Service. Montgomery has been designated regional headquarters for Alabama, Georgia, Louisiana, and Texas.

DR. CARL A. PETERSON, of Moline, Ill., has been named a District Superintendent of Health on the staff of the Illinois State Health Department. Moline will be his address.

DR. HARRY A. YEAGER has recently been appointed Health Officer of Litchfield, Ill.

DR. SOPHIE B. D. EBERLE, recently of New Haven, Conn., has been appointed in charge of the Pueblo Indians in the vicinity of Albuquerque, N. M.

DR. FRANK C. DIVER, of Springer, N. M., has been appointed Health Officer of the Ninth New Mexico Health District.

DR. DANIEL L. SECKINGER, formerly Epidemiologist for the Georgia State Department of Health, has been appointed Assistant Health Officer for the District of Columbia.

DR. SAMUEL J. DICKEY, who has been on the staff of the Pennsylvania State Department of Health for about 10 years, has been appointed Medical Director of Chester County, Pa.

DR. HOWARD F. STRAUB, of Selingrove, Pa., has been named Medical Director of Snyder County, Pa., succeeding Dr. Russell W. Johnston.

DR. DUNN HAMILTON ROW, of Indianapolis, Ind., sailed November 1, for Shikarpur, Baluchistan, India, where, with 4 other eye specialists, he will conduct an eye clinic.

DR. CHARLES E. HOLLAND has been appointed Health Officer of Bloomington, Ind., succeeding Dr. Russell A. DeMotte.

LAWRENCE W. BASS, PH.D., Fellow A.P.H.A., Director of Research of the Borden Company, has been elected Chairman for 1936 of the New York Section of the American Chemical Society. He succeeds Professor Arthur W. Hixon, of Columbia University.

HERMAN N. BUNDESEN, M.D., of Chicago, F.A.P.H.A., is a Democratic candidate for Governor in Illinois.

ABBOTT B. MITCHELL, M.D., member A.P.H.A., has recently severed his connection with the Allegan County Health Department, Allegan, Mich., and has taken a position with the Michigan State Department of Health as Director of the Bureau of County Health Administration.

HUGH S. CUMMING, M.D., Fellow

A.P.H.A., Surgeon General of the U. S. Public Health Service, Washington, D. C., has been appointed one of an executive committee of ten, named by the Health Section of the League of Nations at its recent meeting in Geneva, Switzerland.

ELSBETH VAUGHAN, of St. Louis, Mo., F.A.P.H.A., was recently awarded the Nightingale Medal by the International Committee of the Red Cross, Geneva, Switzerland.

DR. MARION F. HARALSON, Senior Surgeon, U. S. Public Health Service, is now Acting Secretary of the Colorado State Board of Health, in the absence of Roy L. Cleere, M.D., member A.P.H.A., of Denver, Colo., who is at the School of Hygiene and Public Health of Johns Hopkins University, Baltimore, Md.

THOMAS F. O'BRIEN, M.D., member A.P.H.A., has been appointed Acting Health Officer for the City of Hartford, Conn., succeeding Charles P. Botsford, M.D., F.A.P.H.A., who retired after 27 years' service.

DR. JOHN A. BUCCIARELLI has succeeded Myron J. Brooks, M.D., member A.P.H.A., retired, as Health Officer of New Canaan, Conn.

DR. MICHAEL D. RIORDAN has been appointed Health Officer of Windham, Conn.

DR. CHARLES MOLINE, of Sunderland, Mass., was recently chosen President of the Franklin County Public Health Association.

JOHN L. LAVAN, M.D., F.A.P.H.A., for 4 years Director of the Department of Public Health and Welfare of Kalamazoo, has resigned to become Commissioner of Public Health of Grand Rapids, Mich.

DR. CHARLES WALTER CLARKE, Medical Director of the American Social Hygiene Association of New York, member A.P.H.A., has been appointed temporary Director of the Bureau of Venereal Disease in the New York City Department of Health.

DR. RILEY H. MILLER, of Ulysses, Kans., has been named Health Officer of Grant County.

LOUIS C. KRESS, M.D., member A.P.H.A., Director of the New York State Division of Cancer Control, has been appointed Chairman of the State Cancer Committee of the American Society for the Control of Cancer, succeeding Dr. Burton T. Simpson.

DR. EDMOND H. SAUVIGNET, of Laredo, Tex., has been appointed Health Officer of Webb County, succeeding Dr. Albert T. Cook, who became Health Officer of the City of Laredo.

DR. ROBERT W. GORDON has been appointed Deputy Manager of Health and Charity of the Health Department of Denver, succeeding Bertram B. Jaffa, M.D., F.A.P.H.A.

DR. JAMES B. UNGLES, of Satanta, Kans., has been appointed Health Officer of Haskell County, succeeding the late Dr. Loring V. Miner.

DR. WILLIAM J. SCOTT, of Ottawa, Kans., was recently placed in charge of the Franklin County Health Unit.

DR. PAUL T. THIBODAUX, of Donaldsonville, has been appointed Health Officer of Donaldsonville, La.

DR. JOHN A. SKLADOWSKY was recently promoted to be full-time Medical Health Officer in the Baltimore Health Department and was assigned to the Western Health District. He has been connected with the Department since 1920.

HARRY GARLAND TIMBRES, M.D., member A.P.H.A., has been appointed assistant in biostatistics at Johns Hopkins University School of Hygiene and Public Health, Baltimore, Md.

FRANK A. KIERNAN, member A.P.H.A., former Executive Secretary of the Massachusetts Tuberculosis League, has been named Director of the New York Tuberculosis and Health As-

sociation. He fills the position left vacant by the resignation of Harry Hopkins two years ago to become Federal Emergency Relief Administrator.

DR. HARVEY J. SKARSHAUG, of Guthrie Center, Ia., has been appointed Health Officer of Fargo, to succeed Burton K. Kilbourne, M.D., Fellow A.P.H.A., who resigned to become State Epidemiologist of Montana.

DR. V. D. KERNS, of Duncan Falls, Ohio, has been appointed Health Officer of Pickaway County, succeeding Dr. Charles C. Beale, of Circleville, resigned.

DR. SAMUEL W. SHELTON, of Guin, Ala., has been appointed Health Officer of Winston County.

DR. GEORGE E. NEWTON, of Fayette, Ala., has been appointed Health Officer of Jackson County, to succeed Dr. Edward A. Thorne, resigned.

DR. PAUL G. SHELL, of Marianna, Fla., was recently placed in charge of a new health unit in Jackson County.

DR. FRANK V. CHAPPELL, formerly of Madison, Fla., has been appointed Health Officer of the Jacksonville District, succeeding Dr. Thomas E. Morgan.

DR. RALPH J. SYKES, of Jackson, N. C., has been appointed Health Officer of Surry County, to succeed Dr. James Allen Whitaker, of Rocky Mount, resigned.

ALFRED D. GREGG, M.D., member A.P.H.A., of Tarboro, N. C., has resigned as Health Officer of Edgecombe County.

DR. FRANCIS EDGAR MAHLA, of Marion, Ohio, has been appointed Assistant State Director of Health, succeeding James E. Bauman, member A.P.H.A., who had held the position 43 years.

DEATHS

FRANCIS X. MAHONEY, M.D., Fellow A.P.H.A., Health Commissioner of Boston, Mass., almost continuously for more than 20 years, died January 14, at the age of 64 years.

DR. KATHARINE BEMENT DAVIS, of Pacific Grove, Calif., died December 10, at the age of 75 years.

CONFERENCES

Feb. 3–15, Institute for Training of Tuberculosis Workers, under the auspices of the National Tuberculosis Association, New York; to be held at New York University, Washington Square, New York.

Feb. 26, Annual Meeting of the Pennsylvania Tuberculosis Society, Allentown, Pa.

Mar. 2–6, Twentieth Annual Session of the American College of Physicians, Detroit, Mich.

Apr. 1–3, American Water Works Association—Canadian Section, Hamilton, Ont.

Apr. 22–25, National Tuberculosis Association, New Orleans, La.

May 11–15, American Medical Association Convention, Kansas City, Mo.

May 14–16, American Water Works Association—Pacific Northwest Section, Aberdeen, Wash.

June 24–27, Seventh Annual Meeting, Western Branch, A.P.H.A.—meeting simultaneously with Canadian Public Health Association—Vancouver and Victoria, B. C.

June 8–12, 56th Annual Convention, American Water Works Association, Los Angeles, Calif.

July 6–11, The Royal Sanitary Institute, Southport, England.

July 25–Aug. 1, The Second International Congress of Microbiology, London.

July 27–31, Second International Congress on Mental Hygiene, Paris.

Sept. 8–10, International Union Against Tuberculosis, Lisbon, Portugal.

Oct. 29-31, Annual Meeting of the Association of Military Surgeons, Detroit, Mich.

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Physician, trained and experienced in health organization activities, sanitation, epidemiology, tuberculosis, venereal investigations, industrial hygiene, hospital administration, etc., seeks position as health officer. Will consider any locality. 202

Gentleman, M.D. University of Pennsylvania, is immediately available for a public health administrative position. Has served as medical director for school inspection service, city health officer, instructor in public health at a well known college and as epidemiologist for a state health department. 203

Physician, experienced county health officer and state epidemiologist, seeks position as health officer or epidemiologist with state or city department of health. 190

Gentleman, M.D., Dr.P.H., University of Pennsylvania, excellent background, desires position as health officer or in other public health administrative capacity. Has served as full-time county health officer, city health officer, assistant state health commissioner, state epidemiologist, and has established and developed a state bacteriological laboratory. 195

M.D., Director of a health unit and public health laboratory, wishes position as commissioner of health or its equivalent. Missouri or Eastern states preferred. 196

Health officer with medical and public health degrees is available for position. Has been director of a county health department. 200

TECHNICIANS

Woman, Vassar graduate, D.Sc. in hygiene with major in immunology, Johns Hopkins University, seeks laboratory work. Has served as instructor in bacteriology and immunology at Vassar and Johns Hopkins and was director of a state hygienic laboratory for six years. 173

Young woman, bacteriology and chemistry major, M.S., desires position with university, hospital, health department or manufacturing company. Experienced laboratory and research assistant in parasitology, histology and serology in a Class A medical school. 193

NURSES

Unusually well-qualified public health nurse, capable of state-wide supervision with ample field experience and full academic background, is available for appointment. East or Middle West preferred. 194

Public health and school nurse, 10 years' experience, wishes position as public health or school nurse or in tuberculosis work. Registered New York and Pennsylvania. 192

MISCELLANEOUS

Physician, graduate of Washington University Medical School, desires position with state department of public health to do educational writing on mental hygiene, child guidance or venereal diseases. Capable of group instruction in health education. 197

Exceptionally well-qualified physician, long experience in social hygiene educational programs, is available for appointment at once. Internationally known author of texts on this subject. 198

Experienced statistician, woman, Cornell University graduate, is available for opening in the statistical field. Has worked on the staff of a city and state health department as well as on special projects. 199

Where no other address is given excepting the key number, address your replies to the American Journal of Public Health, 50 West 50th Street, New York City, indicating clearly the key number on the envelope. Your replies will then be forwarded.

American Journal of
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And The Nation's Health

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CONTENTS

Continued on page vi

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Readers' Guide in your library.

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Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932.

Continued on page viii

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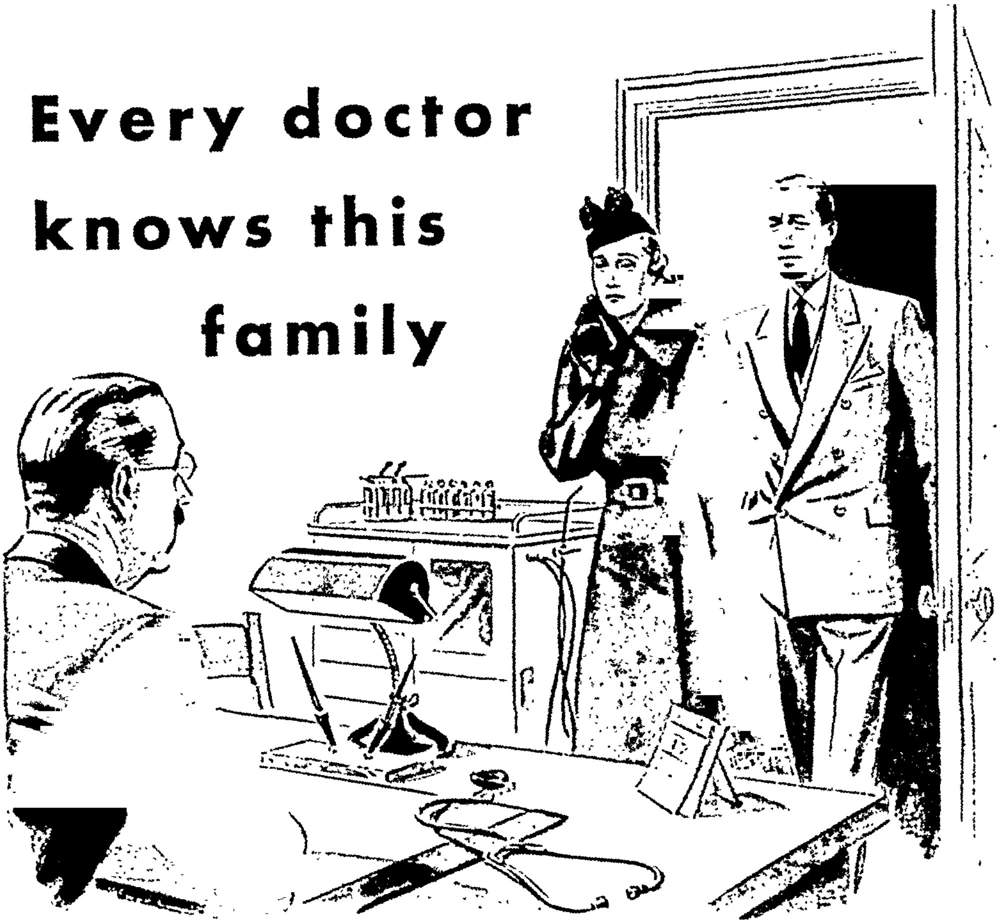

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1935–1936
(See Supplement)

MEETINGS OF AFFILIATED SOCIETIES

and A. P. H. A. Branches

Society	*Secretary*	*Place and Time of Annual Meeting*
Connecticut Public Health Assn.	Ira V. Hiscock	May, 1936
Florida Public Health Association	S. G. Thompson, D.P.H.	To be announced
Georgia Public Health Association	M. E. Winchester, M.D.	To be announced
Massachusetts Public Health Assn.	G. Donald Buckner, S.B.	To be announced
Michigan Public Health Association	Marjorie Delavan	Lansing, November, 1936
Missouri Public Health Association	Dr. C. F. Adams	Columbia, Mo., September, 1936
New Mexico Public Health Assn.	Miss Eleanor L. Kennedy	May 6–8, 1936
Northern California Public Health Association	Dr. I. O. Church	San Francisco, March, 1936
Ohio Federation of Public Health Officials	W. D. Bishop, M.D.	Columbus, November, 1936
Pennsylvania Public Health Assn.	J. Clarence Funk	May 19–21, 1936
South Carolina Public Health Assn.	Laura Blackburn	April, 1936
Southern California Public Health Association	T. P. B. Jones	To be announced
Texas Public Health Association	Lewis Bracy	Kilgore, October, 1936
Virginia Public Health Association	Dr. A. L. McLean	To be announced
West Virginia Public Health Assn.	John Thames, M.D.	October, 1936
Southern Branch, American Public Health Association	G. Foard McGinnes, M.D.	To be announced
Western Branch, American Public Health Association (joint meeting with Canadian Public Health Association)	William P. Shepard, M.D.	Vancouver and Victoria, B. C., June 24–27, 1936

Reprints from the American Journal of Public Health

A Suggested Community Mental Hygiene Program. By George S. Stevenson, M.D. 8 pp. 15c. [From December, 1931, issue.]

Application of the Principles of Water Purification to the Control of Swimming Pools. By A. H. Fletcher and A. E. Clark. 21 pp. 25c. [From May, 1933,]

Chemical Treatment of Sewage: Report of Committee on Sewage Disposal, American Public Health Association. 212 pp. 50c.

Diphtheria Immunization by One Injection. By V. K. Volk, M.D., D.P.H. 4 pp. 10c. [From April, 1935, issue.]

Epidemic Encephalitis Symposium. By Joseph F. Bredeck, D.P.H., James P. Leake, M.D., Josephine B. Neal, M.D., Ralph S. Muckenfuss, M.D., Theodore C. Hempelmann, M.D., Howard Anderson McCordock, M.D., and Thomas M. Rivers, M.D. 20 pp. 20c. [From November, 1933, issue.]

Health Aspects of Fruit Beverages. By Walter H. Eddy, Ph.D. 8 pp. 15c. [From. Feb., 1933, issue.]

Home Canning and Public Health. By Fred W. Tanner. 13 pp. 20c. [From March, 1935, issue.]

Hydrocyanic Acid Gas and Other Toxic Gases in Commercial Fumigation. Aimé Cousineau and F. G. Legg. 20 pp. 25c. [From March, 1935, issue.]

Media Suggested as Substitutes for the Standard Nutrient Agar Used in Routine Milk Control Work. By Robert S. Breed, Ph.D. 3 pp. 15c. [From May, 1935, issue.]

Mental Hygiene Symposium. By Ira S. Wile, M.D., Esther L. Richards, M.D., William A. White, M.D., Clarence H. Hincks, M.D., and Elizabeth I. Adamson, M.D. 28 pp. 25c. [From March, 1933, issue.]

Milks of Special Antirachitic Value (Symposium). By John McK. Mitchell, M.D., John Eiman, M.D., Dorothy V. Whipple, M.D., Joseph Stokes, Jr., M.D., Alfred F. Hess, M.D., Theodore F. Zucker, PhD., G. C. Supplee, Ph.D., J. G. Hardenbergh, V.M.D., L. T. Wilson, Ph.D.; and Milk and Dairy Products report from *1932–1933* Year Book. *36* pp. 25c. [From December, 1932, and January, March and June, 1933, issues.]

Motivation in Health Education. By Benjamin C. Gruenberg. 9 pp. 15c. [From Feb., 1933, issue.]

The Nutritional Aspects of Milk Pasteurization. By E. V. McCollum. 4 pp. 10c. [From September, 1934, issue.]

Official Regulations Governing Allotments and Payments to States from Funds Appropriated Under the Provisions of Section 601, Social Security Act, for the Fiscal Year 1936. Hugh S. Cumming, Surgeon General. 4 pp.

Participation of Lay People in the Promotion of a Rural Child Health Program. By Emma Rood, R.N. 8 pp. 15c. [From October, 1932, issue.]

Precision in the Choice of Health Education Methods. By William P. Shepard, M.D., and Adelheid Arfsten. 5 pp. 10c. [From January, 1936, issue.]

Proposed Federal Food and Drugs Act: Its Public Health Features. By Walter S. Frisbie. 5 pp. 15c. [From December, 1933, issue.]

The Social Security Act in Its Relation to Public Health. By C. E. Waller, M.D. 9 pp. 20c. [November, 1935, issue.]

Some Factors Involved in the Use of Chloramines for the Disinfection of Swimming Pools. By A. H. Fletcher and E. C. Link. 8 pp. 15c. [From December, 1933, issue.]

Swimming Pools and Other Bathing Places. Reports of the Joint Committee on Bathing Places of the American Public Health Association and the Conference of State Sanitary Engineers, 1930. 45 pp. 25c.

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Typhoid Vaccine Studies*

Investigation of Virulence and Antigenic Properties of Selected Strains of the Typhoid Organism

THE LABORATORY STAFF, ARMY MEDICAL SCHOOL, UNDER THE SUPERVISION OF J. F. SILER, M.D.

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THE use of typhoid vaccine for individual prophylaxis was first introduced into the United States on a large scale by General F. F. Russell, of the U. S. Army. The preliminary studies were made by him at the Army Medical School, in Washington, D. C., and, after thorough investigation of such work in England and Germany, production of vaccine was begun in 1908. The following year vaccination was commenced in the Army as a voluntary measure; it became applicable to all military personnel in 1912.

The strain of the typhoid bacillus selected for the preparation of the vaccine was the well known Rawlings strain isolated by Wright in 1900 and used by Leishman for the preparation of the British Army vaccine. The original technic of preparation here combined the German saline suspension of agar cultures with the British method of counting, of killing at a relatively low temperature, and of preserving with cresol. Although minor changes have been made occasionally, the technical procedures have remained essentially the same throughout the years. The Rawlings strain is still in use.

From time to time suggestions have been made to the effect that a change in technic, such as: that the use of formalin for killing and preserving would reduce reactions and preserve the original antigenic qualities of the vaccine, or that the use of a different strain—a freshly isolated strain, or several strains—of the typhoid bacillus would improve the immunizing potency of the vaccine. Such suggestions have always received serious consideration, as evidenced by the recent thorough discussion of the subject by Hawley and Simmons.

That the vaccine as it has been prepared, using the Rawlings strain, is efficiently immunogenic has been amply demonstrated by the trend of typhoid fever in the U. S. Army and the U. S.

* Presented by Major A. Parker Hitchens, M.C., before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 10, 1935.

Navy following its introduction as a preventive measure. With the record achieved, it is obvious that any change in the method of preparation of the vaccine or in the strain of bacillus used must await thorough study of all factors involved. Before any modification can be considered seriously there must be ample proof, gained by a dependable method, that through it the vaccine will be no less protective than it has been in the past. The development and production of the Army typhoid vaccine is a major function of the Army Medical School. It is, therefore, in conformity with this duty that the investigations now under way were undertaken. They relate to studies of selected strains of the typhoid bacillus, the purpose in view being the utilization of all recent developments in bacteriology and in immunology to determine when, and how, it may eventually be practicable to improve still further the protective qualities of the typhoid vaccine prepared for and used by the Army, Navy, and other government bureaus as a protective measure.

Great credit must be given to Grinnell for his originality in applying to the direct evaluation of virulence and immunogenic potency of vaccine strains a method which has been at our disposal for many years. He used the intraperitoneal injection of mice to study the relation of the killing power of various strains of the typhoid bacillus to their immunizing activity, and correlated these factors with their colonial and antigenic structural characteristics. In this work he brought together and used to a practical end those recent developments in the study of bacteriology which might otherwise have remained nothing more than intensely interesting and possibly controversial research phenomena. The result of Grinnell's work is that we now have an experimental method which may give us an approach to the standardization of typhoid vaccine.

THE STRAINS OF EBERTHELLA TYPHOSA CONCERNED

From the numerous strains available 7 were finally selected for this work. Each of them is representative of the group to which it belongs; together they include the types of typhoid bacilli most under discussion at present.

1(I)

This is the Army Medical School culture of the English Rawlings strain which was brought to the United States by General F. F. Russell in 1908. Since 1910, it has been used in the preparation of typhoid vaccine at the Army Medical School. Subsequent to the observations of Arkwright it has been considered an intermediate form, being neither completely rough nor typically smooth. The colonies grow rapidly, are round or nearly so, with smooth edges sloping upward to a slightly raised center. Under 5X magnification colonies have a slightly roughened appearance. In consistency, they are moist and homogeneous. When grown in broth a uniform turbidity is produced; the growth on agar is easily made into a stable uniform suspension in saline. It is actively motile. The majority of the bacilli are of average size with the variations usually seen in old stock cultures—individuals vary from short, almost coccal or oval to long, curved forms.

The average lethal dose* (a.l.d.) for mice is approximately 400 million organisms in Ringer's solution suspension. In mucin suspension the m.l.d. is approximately 100 million in Swiss mice.

1(R)

This is a typical rough variant of 1(I) obtained from the agar transplant

* Average lethal dose (a.l.d.) is defined as the number of bacilli which have been found to kill 50 per cent of the mice injected; m.l.d. is that which kills 100 per cent. In this work mature, white mice weighing 18 to 20 gm. have been used. The observation period is up to and including 72 hours.

of a 17 day old infusion broth culture of the latter. The colonies are rapidly growing, flattened, with irregular margins, and roughened surfaces. In consistency, they are dry and granular. Growth in broth is luxuriant, with pellicle formation and sedimentation, the intervening medium being clear or only slightly clouded. While growth on agar is abundant, a uniformly turbid suspension of it in saline is made only with difficulty. The suspension agglutinates spontaneously forming flakes of varying size. In hanging drop the bacilli are seen to be actively motile; stained preparations show atypical forms, many of them being large, thick, curved rods. The young organisms, while typical bacilli in form, are larger than those of the same age of the parent strain.

The a.l.d. for mice is approximately 400 million organisms in Ringer's solution suspension.

1(s)

A typical smooth form of 1(I) obtained from the agar transplant of a 17 day old infusion broth culture of the parent organism (isolated in 1931). The colonies grow slowly and are considerably smaller than 1(I) colonies. They are round, with even margins and smooth surfaces, characterized by a heaped center giving the colony the geometrical appearance of a half-sphere. In consistency they are moist and homogeneous. Growth in broth produces uniform turbidity, and the growth on agar is easily suspended in saline. The bacilli are actively motile; in stained smears they are indistinguishable from those of the parent culture.

The a.l.d. for mice is approximately 400 million organisms in Ringer's solution suspension.

53

Isolated from the blood of a mild case of typhoid fever, at Walter Reed General Hospital, in May, 1932. The blood serum of the patient contained both flagellar and somatic agglutinins. Colonies are round, of medium size, have raised centers, and slightly irregular margins from which ridges begin, converging to the center. The consistency of the colonies is moist and homogeneous. This strain produces uniform turbidity in broth; the growth on agar is easily suspended in saline. It is actively motile; there is nothing characteristic on a stained film.

The a.l.d. for mice is approximately 300 million organisms in Ringer's fluid suspension.

36

Isolated in October, 1933, from the blood of a patient at Walter Reed General Hospital. Clinically a very toxic type of infection. No flagellar and little if any somatic agglutinins could be demonstrated in the patient's serum. Moreover, the latter failed to agglutinate this organism. It was an O inagglutinable strain.

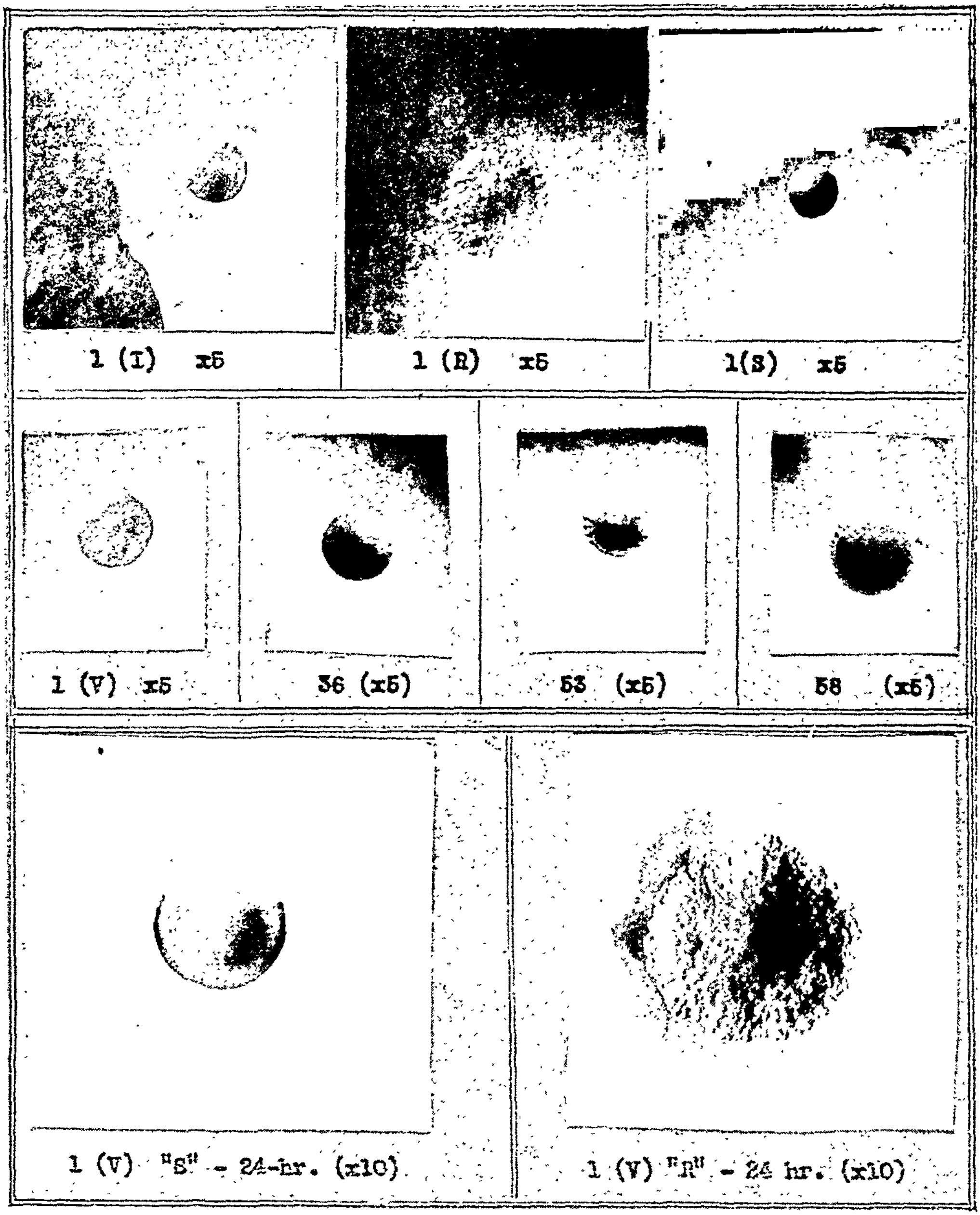
Colonies are round and dome-shaped, with smooth margins and surfaces, of medium size, and characterized by a translucent brownish center. Consistency, moist and homogeneous. It produces uniform turbidity in broth; growth on agar is easily suspended in saline. The bacilli are actively motile, and the individuals are of uniform, but slightly smaller than average size.

The a.l.d. for mice is approximately 75 million organisms in Ringer's fluid suspension.

58

The "Panama Carrier Strain," isolated in September, 1934, from the feces of a carrier (attack of typhoid fever in 1913) in Panama, by Dr. L. B. Bates. The colonies are larger than average, round, with sides sloping gradually to raised, flat centers; the margins are slightly crinkled; the consistency is moist and homogeneous. Growth in broth produces uniform turbidity; growth on agar is easily suspended in saline. The bacilli are actively motile;

TYPICAL COLONIES OF STRAINS OF E. TYPHOSA USED IN THIS WORK



NOTE: Colonies in upper block, 1(I) to 58, 18 hours old.

a stained preparation shows them to be small, short rods, uniform in size.

The a.l.d. for mice is approximately 100 million organisms in Ringer's solution suspension. In mucin suspension the m.l.d. is 100 bacilli, in Swiss mice.

1(v)

Rawlings-Bensted. A rejuvenated (by mouse-passage) race of the Rawlings strain, obtained from Colonel Perry of the R.A.M.C., Netley, England, in October, 1934. The colonies produced by this culture grow rapidly, they are large, round, and perfectly smooth. Growth in broth produces uniform turbidity; the moist and homogeneous growth on agar is easily made into a uniform and stable suspension in saline. The bacilli are actively motile, although non-motile colonies have been encountered in this study. A stained preparation shows them to be small rods, uniform in size.

The a.l.d. for mice is approximately 75 million organisms in Ringer's solution suspension.

PRESERVATION OF STRAINS

In order that strains shall remain without change, at least, until the completion of these studies, special measures have been taken to provide against the differences likely to occur in routine cultivation. In January of this year, prior to the commencement of the virulence tests, each strain was frozen and dried by the method of Flosdorf and Mudd. The growth from agar cultures after suspension in veal infusion, peptone broth (pH 7.4) was distributed into sterile, pyrex ampules. The am-

TABLE I

PRELIMINARY TOXICITY TEST

JAN. 23, 1935

		Dose in Millions of Organisms								
Strains	*Time Period*	*50*	*100*	*200*	*400*	*600*	*800*	*1,000*	*1,200*	*1,400*
1(I)	24-hr.			1/5	2/5	3/5	4/5	5/5		
	48-hr.			nc	nc	nc	1/5			
	72-hr.			nc	nc	nc				
	Total			1/5	2/5	3/5	5/5	5/5		
1(S)	24-hr.			0/5	3/5	5/5	5/5	4/5		
	48-hr			nc	nc			1/5		
	72-hr.			nc	nc					
	Total			0/5	3/5	5/5	5/5	5/5		
53	24-hr			2/5	5/5	5/5	5/5	4/5		
	48-hr.			1/5				1/5		
	72-hr			nc						
	Total			3/5	5/5	5/5	5/5	5/5		
1(R)	24-hr.					1/5	3/5	5/5	5/5	5/5
	48-hr.					nc	1/5			
	72-hr.					nc	nc			
	Total					1/5	4/5	5/5	5/5	5/5
36	24-hr.	1/5	4/5	5/5	4/5	4/5				
	48-hr.	nc	1/5		(*)	nc				
	72-hr.	nc				1/5				
	Total	1/5	5/5	5/5	4/5	5/5				
58	24-hr.	3/5	3/5	4/5	5/5	4/5				
	48-hr.	2/5	1/5	1/5		(*)				
	72-hr.		nc							
	Total	5/5	4/5	5/5	5/5	4/5				
1(V)	24-hr.	1/5	4/5	4/5	5/5	5/5				
	48-hr	2/5	1/5	1/5						
	72-hr.	nc								
	Total	3/5	5/5	5/5	5/5	5/5				

Explanation: Denominator represents number of mice injected; numerator indicates number of mice dead within respective period; "nc" denotes no change; (*) signifies one mouse missing from cage.

pules were immersed in alcohol chilled to about –78° C. by means of CO_2 snow, then they were attached to the manifold and suction applied by means of a vacuum pump. Drying of the suspension was effected without thawing. After 5 to 6 hours, during which time a high vacuum was maintained, the ampules were sealed off in a blow pipe flame—without breaking the vacuum. They were stored in a refrigerator whose temperature is about 5.0° C. Up to the present no change of any kind has been detected in the strains preserved in this way.

TESTS FOR TOXICITY OR VIRULENCE

These tests were carefully planned in order that the bacteria of the various strains would be of the same age at the time of their injection. This required the coöperation of the entire technical staff of the Army Medical School. To insure thorough understanding on the part of everyone a " dry run " was enacted the day before the first series of tests was made.

The cultures, grown exactly as for the production of typhoid vaccine, were suspended in buffered Ringer's solution when they were from 18 to 20 hours old. The suspensions were then counted in a Helber counting chamber; the average of at least 3 counts was considered as giving the greatest accuracy obtainable.

The suspensions were then diluted to the desired strength with buffered Ringer's solution. The dose for a mouse was adjusted so that in every instance it was contained in 0.5 c.c. of fluid. This amount was injected intraperitoneally, the skin of the mouse being first touched by a cotton swab moistened with alcohol. Tuberculin syringes of 1.0 c.c. capacity were used; these carried a 5/8" –25 gauge needle. Great care was taken to see that the injected mice were properly fed and watered.

Two sets of tests were made—a preliminary and a final. In the preliminary test, lots of 5 mice each received the same dose. Five different doses were injected for each strain. The information desired was the a.l.d. for each strain. This is the number of bacilli which will kill 50 per cent of the mice. Table I shows the results of the preliminary tests.

The information gained was used in estimating the range of dosage for the final tests. In this, 5 different amounts were injected. The amounts were adjusted so that the a.l.d. might fall at the middle dose. For the lowest and the highest doses 10 mice were injected and 30 for each of the 3 intermediate doses. The counting and method of injecting were identical with those of the preliminary tests. The results are shown in Table II.

VACCINE PROTECTION TESTS

Having determined the a.l.d. for each of the 7 strains the next point was to use this information to determine the relative protective value of vaccines made from them. The tests were planned so that the protective potency of the vaccine of each strain would be ascertained not only for itself but for each one of the other strains. In other words, cross-protection tests were made in all directions. Furthermore, the extent of the protection was ascertained by testing against not only one, but also against multiples of the a.l.d. In this, as in the virulence tests, there were a preliminary and a final series of tests.

The vaccines were made exactly as the regular typhoid vaccine is made, routinely, in the Army Medical School. They were standardized so that the first dose was 100 million, the second and the third 200 million typhoid bacilli. These amounts were contained in 0.25 c.c. of the vaccine. Injections were made intraperitoneally at weekly intervals. Two weeks subsequent to the final dose the test injections were given as in the virulence tests. The results of the prelim-

TABLE II

FINAL TOXICITY TEST

JAN. 31, 1935

Strain of E. typhosa	*Time Period*	*Dose in Millions of Organisms* 12.5	25	50	100	200	400	600	800	1,000	1,200
1(I)	24-hr.					0/10	1/30	7/30	8/30	9/10	
	48-hr.					nc	nc	nc	6/30	4/10	
	72-hr.					nc	nc	nc	nc		
	Total					0/10	1/30	7/30	14/30	10/10	
1(R)	24-hr.						5/10	27/30	27/30	29/30	10/10
	48-hr						1/10	nc	1/30	nc	nc
	72-hr.						nc	nc	nc	nc	nc
	Total						6/10	27/30	28/30	29/30	10/10
1(S)	24-hr.				0/10	6/30	10/30	27/30	8/10		
	48-hr.				nc	2/30	8/30	nc	1/10		
	72-hr				nc	nc	1/30	nc	nc		
	Total				0/10	8/30	19/30	27/30	9/10		
53	24-hr			0/10	2/30	6/30	25/30	8/10			
	48-hr.			nc	1/30	nc	2/30	2/10			
	72-hr.			nc	nc	nc	nc	nc			
	Total			0/10	3/30	6/30	27/30	10/10			
36	24-hr	1/10	4/30	7/30	25/30	10/10					
	48-hr	nc	4/30	1/30	3/30	nc					
	72-hr.	nc	nc	nc	nc	nc					
	Total	1/10	8/30	8/30	28/30	10/10					
58	24-hr.	0/10	1/30	4/30	20/30	8/10					
	48-hr.	nc	1/30	1/30	3/30	1/10					
	72-hr.	nc	nc	nc	nc	nc					
	Total	0/10	2/30	5/30	23/30	9/10					
1(V)	24-hr.	0/10	10/30	15/30	25/30	10/10					
	48-hr.	nc	4/30	8/30	nc	nc					
	72-hr.	nc	nc	nc	nc	nc					
	Total	0/10	14/30	23/30	25/30	10/10					

Explanation: Denominator represents number of mice injected; numerator expresses number of mice dead within indicated period; "nc" denotes no change.

inary immunization test are shown in Table III.

This may be considered a satisfactory result. The first dose for each strain in the protection test was estimated to be one-half the a.l.d. In other words, it was the intention to have for each group of 5 vaccinated mice an amount below that expected to kill more than 2 of them. That things did not turn out exactly according to the plan is merely one more illustration of the wide limits of accuracy, resulting from several uncontrollable factors, attainable in such work. On the other hand, a high percentage of the control mice died and a high percentage of the vaccinated mice lived. Furthermore, the indication is clear that vaccines made from strains 58, 36, and 1(V) afforded better protection than did the others.

Another interesting factor suggested by this series is that mice which received living bacilli belonging to strains 1(I), 1(R), 1(S), and 53 were not protected so well as those which received as their test dose bacilli of strains 36, 58, and 1(V). One explanation for this is immediately apparent when we note the enormous numbers of bacilli it was necessary to inject when testing with members of the avirulent group.

The information gained from careful study and discussion of these preliminary cross-immunity tests was used in planning the final one. In this the conditions were identical with those of former tests. Planting of cultures on the day prior to the injection of the test doses of living organisms, was so timed as to make the whole chronological set-up uniform. The injections were

TABLE III

TEST FOR IMMUNITY AND CROSS IMMUNITY

MARCH 14, 1935

Injections of Live Organisms		*Percentage of Deaths Among Lots of Five Mice, Each Lot Immunized, Respectively, with the Following Vaccines 14 Days Previously*							
Strain	*Numbers (in millions)*	*1(I)*	*1(R)*	*1(S)*	*36*	*53*	*58*	*1(V)*	*None—Normal Controls*
1(I)	800	40	0	0	0	20	20	0	100
	1,600	100	80	60	100	100	20	60	100
	3,200	80	100	100	100	100	80	100	100
	6,400	100	100	100	100	100	100	100	100
	12,800	100	80	100	100	100	100	100	100
1(R)	500	20	0	0	0	0	0	0	80
	1,000	20	40	60	20	40	0	40	100
	2,000	100	80	100	80	100	100	100	100
	4,000	80	80	100	80	100	80	80	100
	8,000	100	100	100	100	100	100	100	100
1(S)	400	0	0	0	0	0	0	0	20
	800	0	20	0	0	0	20	0	100
	1,600	40	60	40	80	60	40	40	100
	3,200	80	100	100	100	100	80	80	100
	6,400	100	100	100	80	100	100	100	100
36	75	20	0	20	0	0	0	0	20
	150	0	0	20	0	20	0	0	100
	300	80	80	80	20	80	0	0	100
	600	100	60	100	20	100	0	0	100
	1,200	100	100	100	80	80	0	60	100
53	300	0	0	20	0	0	20	0	40
	600	0	20	20	0	0	0	0	100
	1,200	80	80	60	80	100	60	60	100
	2,400	100	60	80	100	80	80	80	80
	4,800	100	100	100	80	100	100	100	100
58	75	20	0	0	0	40	0	0	0
	150	60	0	20	0	20	0	0	60
	300	80	60	80	20	40	0	0	100
	600	80	80	100	0	60	0	0	100
	1,200	100	100	100	60	100	20	40	100
1(V)	25	0	0	0	0	40	0	0	20
	50	40	0	40	0	0	0	0	20
	100	60	20	60	0	40	0	0	100
	200	80	60	80	0	60	0	0	100
	400	100	80	80	20	60	0	20	100

90.5% of the deaths among the vaccinated mice occurred during the first 24 hrs.
9.5% . . . .2nd 24 hrs.
97.7% of the deaths among the normal mice occurred during the first 24 hrs.
The remainder, or 2.3% were dead at the end of 48 hours.

made by a uniform technic, and the mice were cared for subsequently as were those of the previous lots. The total number of mice used in this series was 6,200, and they were all injected between 8:00 A.M. and 3:00 P.M. The results are shown in Table IV.

Examination of this table gives in probably a more satisfactory and conclusive manner the same information as that gained from the preliminary cross-protection tests. The death rate among the controls was closer to the ideal. In the case of 58 and 1(V) the results might have been even more convincing if the dosage had been somewhat higher.

It is quite clear that we are dealing with two different groups of strains so far as virulence is concerned. In the tests with living bacilli of the relatively avirulent group it appears that the dosage was so high that differences in protective value of the vaccines were almost obliterated. When we examine the results among the groups which received as their test doses bacilli of the

TABLE IV

FINAL IMMUNIZATION TEST

MARCH 27, 1935–APRIL 24, 1935

Injections of Live Organisms		*Percentage of Deaths Among Lots of Mice, Each Lot Immunized, Respectively, with the Following Vaccines 14 Days Previously*							
Strain	*Numbers (in millions)*	*1(I)*	*1(R)*	*1(S)*	*36*	*53*	*58*	*1(V)*	*Controls*
1(I)	400	0	0	20	0	0	0	0	40
	800	16	13	13	10	3	4	10	80
	1,600	67	60	69	63	82	53	79	100
	3,200	96	96	96	86	96	100	86	100
	6,400	90	80	100	90	100	90	100	100
1(R)	400	0	0	0	0	0	0	0	20
	800	10	0	16	10	20	3	16	80
	1,600	56	43	30	43	79	30	67	100
	3,200	82	82	92	97	100	90	92	100
	6,400	90	90	90	100	100	80	100	100
1(S)	400	0	10	0	0	0	10	0	20
	800	43	36	36	20	46	14	13	80
	1,600	79	82	79	36	89	63	89	100
	3,200	96	89	100	100	96	82	96	100
	6,400	100	90	90	90	100	100	100	100
36	75	0	10	0	0	0	0	0	40
	150	43	0	33	0	30	0	0	100
	300	53	30	76	0	82	16	0	100
	600	92	86	79	0	92	3	3	100
	1,200	90	90	70	30	100	10	40	100
	2,400	90	100	100	50	100	80	70	100
53	300	0	10	0	0	10	0	0	0
	600	7	13	10	0	7	7	7	60
	1,200	60	76	56	3	53	30	20	100
	2,400	86	92	86	92	92	82	86	100
	4,800	100	100	90	80	100	100	90	100
58	75	0	0	0	0	10	0	0	20
	150	7	0	10	0	0	0	0	40
	300	10	3	43	0	13	0	0	80
	600	46	13	60	0	82	0	0	80
	1,200	80	50	80	0	90	10	20	100
	2,400	100	90	80	10	100	0	20	100
1(V)	25	20	0	10	0	10	0	0	0
	50	10	0	13	0	10	0	0	0
	100	13	3	26	0	20	3	0	0
	200	36	16	30	3	56	0	0	20
	400	60	40	60	0	40	0	0	80
	800	100	100	100	30	100	0	20	100

more virulent strains, however, wide differences in the protective value of the vaccines are apparent. Here again the strains are clearly grouped. The strains 36, 58, and 1(V) are more efficiently immunogenic than are 1(I), 1(R), 1(S), and 53.

DISCUSSION

In such work as this one is constantly seeking to differentiate between toxicity and virulence and between these terms and invasiveness. The last, it is believed, should be restricted to cases in which the animal species concerned is susceptible to natural infection by the organism concerned; to cases in which, by some means, the microörganism gains access to the tissue for which it has a special predilection and develops there eventually causing morbidity and possibly mortality. The sickness most frequently exhibits a characteristic clinical picture. The type of clinical syndrome usually depends upon the characteristic metabolic products of the infectious process.

It is not so easy to separate virulence from toxicity. In any case, toxicity is not a good word to be employed in so vague a manner. Ehrlich defined the

word toxin so clearly and definitely that its use in any other sense is really not admissible. The trouble is that we have no other term to express the idea here. In the injection of enormous doses of relatively avirulent typhoid bacilli we have almost overwhelmed the mice by a mass of noxious or "toxic" material which gives their acquired vaccinogenic immunity no chance to demonstrate its existence. The differences in immunity which we do discover are the result of combinations of noxiousness or "toxicity" and virulence in which the former is not sufficient to overwhelm the animal. On the other hand, it acts somewhat like an "aggressin" and prepares the mouse for a result dependent upon whatever virulence the particular strain of relatively avirulent bacilli may have.

CONCLUSIONS

There seems to be some indication in these results that immunogenic properties of typhoid organisms are associated with their virulence. The virulent organisms used in this experiment, when used as a heat-killed tricresol preserved vaccine in the number of mice tested, gave better protection than that afforded by the avirulent group under similar circumstances.

Laws, Dealer's Insurance

. . . Instead of protesting against health legislation, the informed milk dealer is one of its most ardent advocates. Aside from his interest as a citizen, he is concerned in a selfish way with the maintenance of standards which will guard the milk supply from any suspicion of being a carrier of disease. Let him think for a moment what it would mean to him if an epidemic were traced to the milk supply of even some small unimportant peddler, to say nothing of what it would mean if one of the large milk concerns were implicated. Attach the stigma of milk-borne infection to even the smallest route and the whole milk industry in that area suffers. Orders are cancelled by the thousands and it is no easy task to convince frightened mothers that their children are safe if they drink the milk of a concern which is not involved in the outbreak. Why, health laws are the best insurance the milk trade can have!

. . . Most large milk distributors, for a purely selfish reason, leave nothing undone to safeguard the purity of their product. But sometimes the small concern or the producer-distributor might not be so careful since, having less investment in the business, he has less to lose and might be more willing to take a chance. Rigidly enforced milk regulations prevent him from taking that chance and thus serve as a safeguard not only to the public health but to every other farmer who produces milk in that area, and every other man who distributes it. There may be laws which seem to serve no worthy purpose but they are comparatively few in number and the burdens they inflict are offset a hundred times over by the value of the good ones. If public health authorities were to announce tomorrow that every regulation governing the sale of milk were to be removed, not 10 days would elapse before leading dealers would be attempting to do, voluntarily, what the laws now require them to do. The only difference is that they could not do the job half so well.—Editorial, *The Dairy Record,* Jan. 8, 1936.

Plumbing Hazard Survey of Pasteurization Plants*

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THE excellent study by the Chicago Health Department culminating in the definite determination of the cause of a striking epidemic of amebic dysentery, has caused many city health departments to become much more attentive to defective plumbing and its health significance. Although sanitary and public health engineers had for a number of years appreciated the dire potentialities of such defects, crystallized interest and demand for effective control were lacking until this epidemic forced the issue in a dramatic and thoroughly convincing manner. Many studies and surveys have been made of faulty plumbing by various agencies and, although complete reports are not available, apparently the studies have been largely confined to hotels and similar buildings, probably because the Chicago epidemic was centered in two hotels having faulty plumbing.

The author, in carrying out a preliminary survey of plumbing in buildings used for a number of purposes, included milk pasteurization plants. It is the purpose of this discussion to bring to attention the potential dangers of the contamination of milk from faulty plumbing in pasteurization plants.

SCOPE AND PLAN OF SURVEY

This investigation was made possible through engineers provided by the professional FERA program. The program was planned on the basis of an investigation or demonstration as required by the FERA. The work was carried out in a systematic manner in order to discover all existing plumbing defects, and as accurately as possible the nature of such defects.

Graduate engineers, with few exceptions unfamiliar with sanitary engineering methods and technic, were available. Considerable time and effort were spent in training them by lectures, field inspections, and literature. Survey blanks for recording information were prepared and a system of standard sketches of piping systems was devised so that defects could also be shown and checked diagrammatically. In the beginning it was arranged that each investigator should spend ample time with an experienced man, so the details of the work were thoroughly understood. Weekly or more frequent conferences were held with all the men in attendance, at which points in question were thoroughly discussed. Upon the completion of a plant the investigators, working in pairs, prepared a written report covering the significant sanitary details. With these data available the work was completely field checked by the most competent and experienced man in direct charge of the work. Sam-

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* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 10, 1935.

ples of the potable water supply were collected from several outlets in each building and analyzed bacteriologically.

Engineers making the surveys were allotted, in accordance with FERA regulations, a varying number of work days each month which obviously did not lead to maximum efficiency. Table I indicates the number of milk plants surveyed, time required, and cost of field work.

TABLE I

NUMBER OF MILK PLANTS SURVEYED, TIME REQUIRED, AND COST OF FIELD WORK

Milk Plant	*Per Cent Completed*	*Man Hours Required*	*Salary Cost*
A	100	114	118.56
B	100	54	56.16
C	100	60	62.40
D	100	36	37.44
E	100	36	37.44
F	60	306	318.24
Total 6		606	630.24

PASTEURIZATION PLANT EQUIPMENT

In order more readily to interpret the results of this survey, it is essential to discuss briefly milk plant equipment and plumbing requirements.

A modern milk plant is concerned with the processing of milk and milk products for the market. Pasteurized fluid milk and cream, butter milk, cultured milk, cheese, and ice cream constitute the principal end products. For the manufacture of these products various types of equipment are necessary, such as pasteurizers, coolers, holding vats, churns, condensers, refrigerators, compressors, brine tanks, bottle and can washers.

Large quantities of water are essential for washing, rinsing, cooling, the generation of steam for power, and sterilizing purposes. It is common practice to rinse equipment with water before milk or milk products are placed in contact with surfaces. Usually the initial cooling is accomplished with tap water and it is not uncommon for the shell or pipe wall separating this cooling medium from the milk to develop leaks. Frequently a product such as butter is washed direct in tap water. Cooling water is used over and over with the aid of roof aerators which are exposed to aerial contamination. Condensers are often employed for cooling the refrigerating medium with tap water, which is used repeatedly with the aid of aeration, or discharged to waste through a solid connection to the sewer. Toilet facilities are provided to maintain satisfactory personal hygiene. It is apparent that the quality and the quantity of the plant water supply are two important items in safe and effective operation.

Provision is made for the disposal of waste water from such plants by means of the usual system of sewer lines. The contents of these lines consist of the sewage from toilet rooms as well as large volumes of waste water from washing and rinsing machinery, floors, and other appurtenances. These sewers carry potentially infectious material and at times are probably overloaded to the extent of producing internal pressure.

RESULT OF SURVEY

The result of a survey of the plumbing and piping systems of 6 milk plants indicated a situation that was extremely complicated, especially in the large plants. The many types of equipment concerned, the frequent maze of pipes, and the various ways that this equipment was inter-connected with water and sewer lines, presented many difficulties in obtaining accurate information. To simplify and clarify the results of the survey the defects found have been grouped into 6 general types according to the way in which the condition becomes a plumbing defect and potential health hazard. "Plumbing defect" is used in a broad sense to include faults in piping systems as well as equipment design.

Type 1—Direct pipe connection between potable water supply and sewage or other contaminated water, with or without check or manual valve between, which through excessive back pressure or negative head, or both, might result in the contamination of the potable supply with sewage or polluted water. Example Type 1—Polluted water pump directly connected to potable water supply, condensers directly connected to potable water supply and also to sewer lines; drains or overflow from potable water tanks directly connected to sewer lines; mechanical refrigerating, units directly connected to potable water supply and sewer lines. Figure I illustrates this type of defect.

Type 2—Potable water supply inlets constantly submerged or submerged because of direct or indirect stoppage that, due to a negative head or vacuum in the potable water supply lines, might result in the contamination of the potable water supply with sewage or polluted water through back siphonage. Example Type 2—Constantly submerged inlets which are hazardous even when the fixtures are in good operating condition; such as siphon jets in water closets and urinal traps, laundry washing machines, processing tanks, water softeners, and stockwater basins. Inlets not ordinarily submerged beneath the surface of the fixture contents but which at times become submerged due to carelessness in filling or to stoppage of outlets; such as flushing rim openings in water closets, urinals, and slop sinks, lavatories, utility room sinks, drinking fountains, bottle washers, loose hose, etc. Figure I illustrates this type of defect.

Type 3—Sewer lines located over pasteurizers or other milk processing equipment; floor drains located in refrigerators or other rooms where food is stored or processed and in rooms where ice is made or prepared for use. Figure I illustrates this type of defect.

Type 4—Water supply subject to aerial pollution. Example Type 4—Potable water supply tanks with open or loose tops or covers located on roof of building or other exposed location.

Type 5—Possible infection of persons through use. Example of Type 5—Faultily designed drinking fountains which can be contaminated by user and result in a hazard to subsequent users.

Type 6—Equipment designed to hold food during processing, surrounded by or containing pipes or jacket through which the water supply is circulated. Frequently this type of equipment is rinsed with tap water just previous to use. The danger from such connections and operation is predicated upon the water supply becoming contaminated due to other faulty plumbing and the development of breaks in the pipes or jacket so that contaminated water would leak into the food supply. Example Type 6—Certain types of milk pasteurizers, milk holding vats, milk coolers, and other equipment in which dairy products are heated or cooled or both.

Based on this grouping of plumbing defects Table II indicates the number of plumbing defects in each milk plant.

Table III indicates the extent to which equipment is involved in various types of plumbing defects.

The number of defective connections found and the extent to which equipment was involved varied greatly depending largely on the size of the plant. Tables IV and V indicating the survey data on 2 milk plants illustrate this wide variation.

TABLE II

NUMBER OF PLUMBING DEFECTS IN EACH MILK PLANT SURVEYED, CLASSIFIED ACCORDING TO TYPES

Milk Plant	*Number of Plumbing Defects Found*						
	Type 1	*Type 2*	*Type 3*	*Type 4*	*Type 5*	*Type 6*	*Total*
A	4	35	1	3	4	12	59
B	0	13	0	0	0	1	14
C	0	21	1	1	0	14	37
D	0	13	2	0	0	9	24
E	0	10	2	0	0	3	15
F	4	43	0	5	5	4	61
Total	8	135	6	9	9	43	210

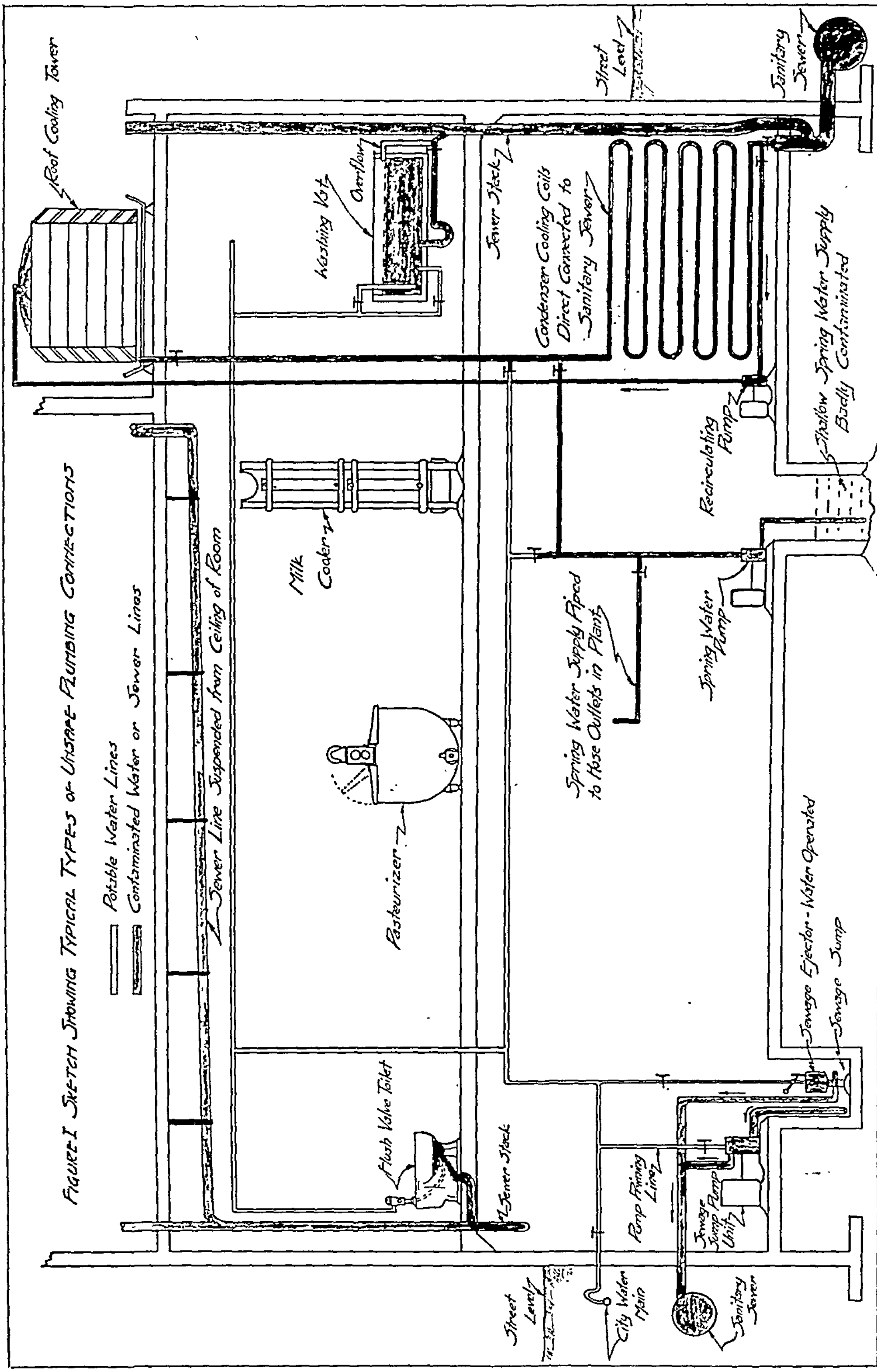

FIGURE I SKETCH SHOWING TYPICAL TYPES OF UNSAFE PLUMBING CONNECTIONS

TABLE III

NUMBER OF PLUMBING DEFECTS IN MILK PLANTS CLASSIFIED ACCORDING TO TYPE AND EQUIPMENT INVOLVED

	Number of Plumbing Defects Found						
Equipment	*Type 1*	*Type 2*	*Type 3*	*Type 4*	*Type 5*	*Type 6*	*Total*
Bottle Sterilizer ..	..	2	..	..	..	..	2
Bottle Washer ...	..	4	..	..	..	..	4
Brine Tank	..	2	..	..	..	..	2
Can Washer	..	5	..	..	..	..	5
Case Washer	..	2	..	..	..	..	2
Cheese Tank	..	..	..	..	..	2	2
Condenser	..	2	..	..	..	..	2
Culture Tank ...	..	6	..	..	..	5	11
Drinking Fountain	..	5	..	..	9	..	14
Floor Drain	..	..	2	..	..	..	2
Flush Toilet	..	25	..	..	..	..	25
Hose	..	51	..	..	..	..	51
Laundry Washer .	..	2	..	..	..	..	2
Milk Cooler	..	..	..	..	..	4	4
Milk Condenser ..	1	..	..	..	..	1	2
Milk Storage Tank	..	..	..	..	..	2	2
Pasteurizer	..	..	..	..	..	29	29
Potable Water Tank	..	..	..	7	..	..	7
Pump	5	..	..	..	..	..	5
Refrigerator	1	..	..	..	..	..	1
Roof Cooler	..	..	..	2	..	..	2
Sewer Pipe	1	..	4	..	..	..	5
Soaking Tank ...	..	1	..	..	..	..	1
Steam Cooker ...	..	4	..	..	..	..	4
Sterilizer	..	1	..	..	..	..	1
Wash Bowl	..	15	..	..	..	..	15
Wash Tank	..	7	..	..	..	..	7
Water Softener ..	..	1	..	..	..	..	1
Total	8	135	6	9	9	43	210

In 2 instances samples of water collected from milk plants showed heavy contamination. In 1 case, an auxiliary spring water supply, cross-connected with the city water supply and also used for cooling and flushing purposes within the plant, showed contamination. In the second instance the water sample was taken from a supply line to a milk cooler.

The survey of 6 milk plants showed the existence of 210 plumbing defects. There were 28 different kinds of milk plant equipment involved in the hazardous connections found. In 152 instances the plant water supply was subject to possible contamination. Forty-three pieces of equipment were found with water jackets or coils which in case of a leakage would allow the plant water supply to come into contact with the milk. In 137, or 65 per cent, of the defects found, back siphonage and in some cases stoppage of outlets, would be necessary to cause a hazard. Ten, or 4.8 per cent, of the defects resulted from direct connections, that is, solid piping without a break existing between contaminated water or sewage and the potable water supply.

DISCUSSION

It seems probable that the contamination of the milk plant water supply

TABLE IV

DEFECTIVE PLUMBING CONNECTIONS—DAIRY "B" SHOWING EQUIPMENT INVOLVED AND TYPE OF DEFECT

	Number of Plumbing Defects Found						
Equipment	*Type 1*	*Type 2*	*Type 3*	*Type 4*	*Type 5*	*Type 6*	*Total*
Loose Hose	..	8	..	..	..	..	8
Milk Storage Tank	..	..	..	..	..	1	1
Wash Bowl	..	5	..	..	..	..	5
Total	0	13	0	0	0	1	14

or some milk product may occur due to the various types of plumbing defects revealed by this survey. The frequency of such an occurrence cannot, however, be determined. The modern health officer is constantly seeking to provide more complete prevention against the contamination of foods. The public health importance of safely handling milk, during the vital process of pasteurization, is evident. Likewise, no effort should be spared to protect public water supplies from contamination.

As far as the more adequate protection of public milk supplies from filth-borne diseases is concerned, many city and state health departments and the U. S. Public Health Service have made notable progress, particularly in the last 10 years. Considerable effort and large sums of money are continually being expended to safeguard further the production of milk, its transportation, and processing by the distributors. It would appear that in our endeavor to improve upon pasteurization, cooling, and other equipment, as well as methods and supervision, the existing system of plumbing in milk plants, and certain details of milk equipment design, have been accepted as satisfactory without sufficient investigation.

It is recognized that at least a partial vacuum may exist without warning in any water piping system due to a number of causes such as a heavy draft in a

TABLE V

DEFECTIVE PLUMBING CONNECTIONS—DAIRY "F" SHOWING EQUIPMENT INVOLVED AND TYPE OF DEFECT

	Number of Plumbing Defects Found						
Equipment	*Type 1*	*Type 2*	*Type 3*	*Type 4*	*Type 5*	*Type 6*	*Total*
Can Washer	..	2	..	..	..	..	2
Drinking Fountain	..	5	..	..	5	..	10
Flush Toilet	..	25	..	..	..	..	25
Laundry Washer ..	..	2	..	..	..	..	2
Loose Hose	..	1	..	..	..	..	1
Milk Condenser ..	1	..	..	..	..	..	1
Pasteurizer	..	..	..	..	..	4	4
Potable Water Tank	..	..	..	5	..	..	5
Pump	2	..	..	..	..	..	2
Refrigerator	1	..	..	..	..	..	1
Steam Cooker	..	2	..	..	..	..	2
Wash Bowl	..	2	..	..	..	..	2
Wash Tank	..	4	..	..	..	..	4
Total	4	43	0	5	5	4	61

main due to a fire, or cutting off the water supply and draining lines for repairs. Such a vacuum has been shown to be capable of siphoning the contents of a flush valve type toilet bowl, in good working order, into the water supply line.

The usual method of protecting potable water lines directly connected to contaminated water or sewer lines against pressure on the non-potable water side from a pump, or back pressure due to the temporary stoppage of surcharging in a sewer line, has been by means of a check or manual valve. The ease and frequency with which such valves are made ineffective by corrosion, stoppage by foreign substances, or even tampering by the careless or uninformed, render their protection very uncertain. In general, these faults of piping or plumbing systems are responsible, in a great variety of modifications, for most of the existing potential hazardous plumbing conditions. The public health reasons for keeping sewage or human fecal material from contact with food or a potable water supply, are too well understood by health officials as well as the public, to require further discussion.

The results of this survey reveal a number of ways in which water supply, milk, and milk products in all the plants surveyed might be contaminated. If the water supply of the plant becomes contaminated with sewage because of one of the above reasons, there are many possibilities of this pollution coming in contact with milk due to leaks in coolers or pasteurizers. Whenever water is used in direct contact with milk products, such as butter, or rinsing surfaces of milk equipment, the danger is obvious. There is also the ever present danger of this contaminated plant water supply back-flowing into the distribution system. Additional examples of a hazardous situation in milk plants is the location of sewage lines directly over equipment used to process milk products, and the dangers due to leakage from joints or corroded pipes.

Many of these defects are obscure and require public health engineering training for their detection as well as rectification. It is a fact also that usually a sequence of unanticipated events must occur to make the potential defects an actual health hazard. This only emphasizes the difficulty of the problem since it creates an entirely false impression of safety.

Certain types of plumbing connections are more dangerous than others. Likewise the type and age of buildings, equipment, maintenance of equipment, and other factors, all have a bearing on the possibility of a health hazard occurring. Direct connections between a contaminated and potable plant water supply with excessive pressure on the contaminated side may be assumed as the most dangerous from the standpoint of possible frequency of occurrences. On the other hand, back-siphonage of the contents of flush toilets would usually be most dangerous from the standpoint of the greatest concentration of infection.

Old plumbing, badly corroded, and lacking many modern safeguards, as well as a poorly maintained piping system, present great potential hazards. Besides defective plumbing, this survey indicated that milk plant equipment is improperly designed in many cases, and may be responsible for contamination of the water supply or milk products.

In general, it is believed that the technical problems involved, and the financial outlay in new milk plant buildings, required to secure complete safety for such plants, would be relatively simple and not burdensome. In older buildings it would require expenditures dependent on the size and complexity of the plant. In the case of plumbing 20 to 25 years old, complete renovation is in order.

The administration of a program for the elimination of such defects presents much greater difficulties than the technical problems. Additional personnel must be thoroughly trained and competent. This will require an intensive training service, since few individuals have had experience with these problems. Careful detailed surveys will be necessary, and recommendations based on the findings must be accurate.

Plans for new plants must be carefully checked and approved before the construction contract for building or equipment is let, and field checked after installation to assure compliance. The work is very definitely a function of the health department and should be under the supervision of a competent public health engineer. When the existing plumbing inspection department is not under the jurisdiction of the health department, close coöperation is essential. The health department should not delegate the responsibility for assuring safe plumbing in milk plants to any other department, for the same reasons that the responsibility for proper milk pasteurizing and cooling equipment is not delegated to another agency.

CONCLUSIONS

A survey of plumbing in 6 milk plants, undertaken to determine whether any condition potentially hazardous to health existed, revealed the following:

1. A total of 210 plumbing defects were found involving 28 different kinds of milk plant equipment.
2. These faulty conditions are due to defective plumbing installations and fixtures, poor design of milk plant equipment, and inexperienced planning of the location and capacities of sewage systems within milk plant buildings.
3. These hazards to health should be eliminated, and in the future supervision of milk plant sanitation should include careful attention to plumbing as well as other features already watched with vigilance.
4. The problems presented by satisfactory control of milk plant plumbing offer no greater technical difficulties than have already been solved in the safe handling and processing of milk and milk products.
5. The responsibility for the administration of the program for correcting existing defects and prevention of future ones should rest with the health department.

Eating Utensil Sanitation*

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THE object in cleansing eating utensils should be not only cleanliness but also disinfection. It is well recognized that the infective organisms of the respiratory or saliva-borne infections are transferred in the nasal or mouth excretions by way of the air-borne route and by indirect contact through food, hand-to-mouth, or eating utensil transmission. Aside from the relative importance of these several avenues of infection distribution it should be pointed out that the saliva-borne infections as a group, including the pneumonias, tuberculosis, influenza, scarlet fever, measles, etc., are responsible either directly or indirectly for from 25 to 45 per cent of our mortality.

We have the pneumonias of infancy, the communicable diseases of children, tuberculosis of early and middle life, the resultant damaged heart and kidney of advanced middle life, and the pneumonias of the aged. If these as a group are to be brought under control, their avenues of distribution must be blocked, as were those for the typhoid group; in the latter case by public water purification and milk pasteurization. Basically there is no difference between the control of these two groups of disease. The same epidemiological principle applies to both: that the major avenue or avenues of spread must be continuously blocked in order to secure control leading to eradication. Such measures of control must be applied not only during an epidemic emergency, but they must be continuous and permanent. This continuous blocking process applies more particularly to the saliva-borne than to the typhoid group. In the latter group massive transmission means an explosive outbreak, while in the saliva-borne diseases, especially the pneumonias and tuberculosis, the distribution of infection is only potentially dangerous and does not immediately manifest itself.

Prior to the 1918 influenza-pneumonia epidemic, the respiratory group of diseases were regarded as air-borne, and practically all effort in their control was directed at the prevention of nose and mouth spray. It is, however, apparent that if the tubercle bacillus or the pneumococcus were present in the saliva this germ laden saliva could be passed from one person to another through inanimate objects by indirect contact, just as one transfers a culture from one test tube to another by a platinum loop. In short, outside the laboratory the eating utensil may do the work of the platinum loop.

It was in 1917, as a result of observations at Camp Tanforan, Calif., on the faulty methods of mess sanitation that the theory of eating utensil transmission was advanced.[1] This theory was supported by epidemiological and laboratory findings. In an epidemiological study of 66,076 troops it was shown that there was an influenza rate of 51.1 per 1,000 troops among those who had the advantage of

* Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

collective washing of utensils, while among those who washed their own mess gear in warm water the rate was 252 per 1,000.[2]

In a second field observation among 5,971 troops it was found that the use of boiling water for washing mess gear gave a protection of 85 per cent against the group of saliva-borne infections by blocking distribution through the 5 link chain of transmission.[3] An investigation in two large cities indicated that mechanical washing as contrasted with hand washing of dishes minimized mass indirect contact and afforded a protection of 80 per cent against influenza infection.[4]

Similarly, in public institutions having a population of 252,186 inmates, those protected against influenza by the machine washing of utensils had but one-third as many cases of influenza as those exposed through the hand washing of dishes.[5]

By laboratory procedures it was shown that 99 per cent of the organisms were removed by the machine method of washing, while but 78 per cent were removed by hand washing.[6] Furthermore, in the latter procedure, pathogenic organisms were isolated from both the wash water and from washed utensils.[7] These investigations included the transmission of tuberculosis from not only the wash water of spoons used by open cases in 35 per cent of the trials, but also from the washed spoons in 25 per cent of the trials.[8]

The joining of the 5 link chain of multiple indirect contact transmission was established by passage of *B. prodigiosis* from oral cavity of donor to that of recipient in 34 per cent of the trials.[9]

AVAILABILITY OF CHLORINE IN SOLUTION

During the last two decades the use of chlorine as a gas, as organic chlorine, and as hypochlorite, has found an extended field of usefulness as a disinfectant. Gaseous chlorine has been adapted to the disinfection of public water supplies and swimming pools. More recently, these preparations have been used to a limited extent for the disinfection of beverage glasses and tableware.

The action of chlorine in solution as a disinfectant is generally attributed to its formation of hypochlorous acid. This acid easily breaks down into hydrochloric acid and oxygen, thus being an oxidizing agent. The oxidizing action on bacteria is thought to be explanatory of the disinfectant properties.

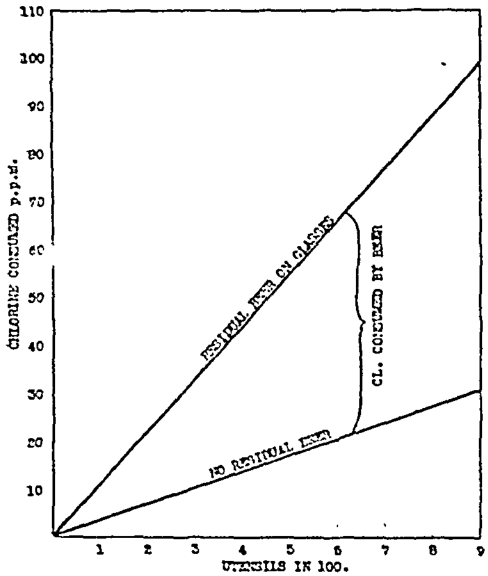
It is evident that the proper alkalinity of the solution for the production of hypochlorous acid is of great importance. This has been shown by Johns (Cf. *Scientific Agriculture,* 14:11, July, 1934) and others. Work must continue, however, to demonstrate the necessity of pH control at high concentrations under practical working conditions such as are maintained in the average restaurant.

The fact that the "available chlorine" does not truly represent the chlorine condition, and, therefore, the germicidal potency of a chlorine solution may be better illustrated by a diagram:

$$\begin{tikzcd} \text{Chlorine compound} \arrow[dr] & Cl_2(HO\,Cl) \arrow[d] & \text{Organic addition products} \arrow[dl] \\ & \text{available chlorine} & \end{tikzcd}$$

In dissolving chloramine T or a hypochlorite, the solution supposedly has available chlorine attached to the parent molecule, chlorine in solution, chlorine as hypochlorous acid, and cer-

CHART I.



WASHING OF BEER GLASSES
Showing consumption of chlorine by residual beer.

tain organic addition products. Ordinarily, we test these solutions by determining the available chlorine which must include chlorine from these various sources. It must be admitted in this connection that hypochlorites, especially sodium hypochlorite, releases all of its chlorine into solution much more readily than chloramine T. A simple experiment was performed to prove this statement. A solution of chloramine T and one of a hypochlorite were prepared, each having 200 parts of available chlorine. Each solution was diluted so as to render 0.3 to 1.0 part of free chlorine. The orthotolidine test was applied to each diluted solution, after adjusting the pH to barely the acid side—using the same amount of reagent in each test. After comparing the standards it was found that in the case of the hypochlorite the results from the orthotolidine test and the U.S.P. potassium-iodide-starch test were the same. While with the chloramine T the orthotolidine test gave about 20 per cent as much available chlorine as did the U.S.P. method. The situation is similar to hydrogen ion concentration and available acidity. Hypochlorites may be likened to highly ionizable acids. It would be expected therefore to obtain disinfectant properties at a lower available chlorine concentration from hypochlorites than from chloramine T.

For practical operation in the field, the available chlorine concentration at which we have a plentiful supply of hypochlorous acid and chlorine in solution is important, also, procedures which might influence the supply of these forms of chlorine in the disinfection of utensils become increasingly important.

In the laboratory the operations can be adjusted to the demands, but in the field practical conditions of oxidation must be provided to insure adequate disinfection.

CHEMICAL DISINFECTION

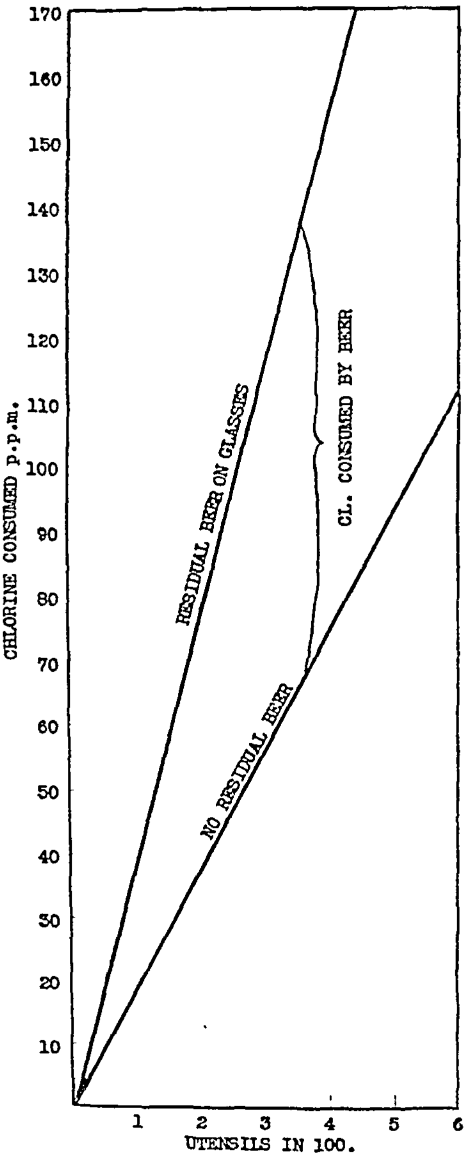
Glasses

While from a public health viewpoint the distribution of disease through beer glasses is of less importance than through eating utensils in public eating places, an extended investigation was carried out to determine, first, the chlorine consumption by residual beer carried directly into the disinfectant solution, and, second, the chlorine consumed by soapy solution carried over by the glasses into the disinfectant.

By the two compartment procedure the glasses with their residual beer were immersed in the chlorine solution for about 2 minutes. They were then rinsed in an overflow compartment of clear water. By this method about 10,000 glasses were treated during a 9 day test period, and hourly samples of the disinfectant were taken to determine the available chlorine. It was found that the chlorine consumed per glass was 0.11 p.p.m. of an organic chlorine preparation.

In contrast with the above experi-

CHART II.



WASHING OF BEER GLASSES
Showing consumption of
chlorine by residual beer.

ment it was found that by using three compartments, in the first, rinsing the glasses in running water, thus removing the residual beer, the chlorine consumption per glass was but 0.034 p.p.m. as shown in Chart I. The residual beer with its organic content consumes about 3 times as much chlorine as when the glasses are previously rinsed.

The residual beer consumes more chlorine per utensil when inorganic chlorine preparations are used than with the organic compounds. In contrast to the above experiment in which chloramine T was used, it was found that the consumption of chlorine in the inorganic form as a result of the addition of residual beer was 0.384 p.p.m. per glass—more than 3 times as much—and that when the glasses were first rinsed the consumption was 0.188 p.p.m. per glass.

Here the importance of the addition of organic matter such as residual beer in the consumption of chlorine is shown. It is apparent that the operation must be closely supervised as to method as well as to the availability of chlorine in the disinfectant solution.

Tableware

In the washing and disinfection of tableware, it was found that the carry-over of residual soapy wash water on the dishes had a decided influence in increasing the consumption of chlorine.

A series of experiments were first run by the three compartment procedure. The first compartment contained soapy wash, the second a hypochlorite solution, and the third clear rinse water. About 3,000 dishes over a 5 day period were washed and disinfected by this method, and at hourly intervals the available chlorine was determined. The consumption of chlorine per utensil was 0.208 p.p.m. or about 20 p.p.m. per hour (Chart III).

In contrast to the above consumption of chlorine, it was found, in a series of tests in which 17,000 dishes were washed and disinfected by the four compartment method which included a rinse of the soapy dishes before immersion in a hypochlorite solution, that the chlorine was consumed at the rate

of only 0.075 p.p.m. per utensil or 10.6 p.p.m. per hour. It will be noted that the organic fatty acids of the soap consumed 0.133 p.p.m. of inorganic chlorine per utensil washed and when not removed by the rinsing process over two times more chlorine was consumed.

In other words, if one were to start with 100 p.p.m., and the residual soapy water on the dishes were added to the chlorine solution, all the chlorine would be consumed in 5 hours; while if the soapy dishes are subjected to a rinse, the disinfectant solution would last 10 hours. Similarly, on the basis of a 100 p.p.m. of available chlorine twice the volume of the solution is needed to meet the requirement when residual soapy water is added.

FIELD BACTERIOLOGICAL INVESTIGATIONS

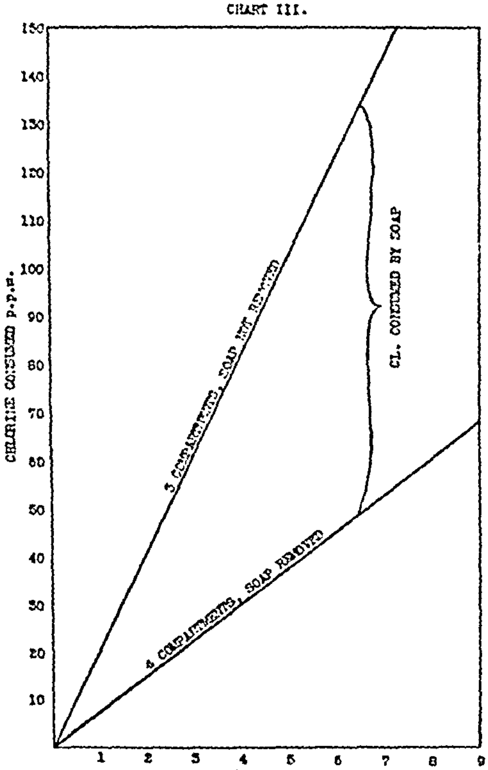
As in our original investigation of the transmission of the saliva-borne diseases, in this work the spoon was used as the bacteriological test utensil. It actually enters the mouth of both donor and recipient, and, because of its large exposed surface area, carries more oral bacteria in the mucus adhering to it than any other utensil. Furthermore, its bacterial load can be determined more easily than that of other utensils. This can be readily done by placing 10 spoons in a pint jar containing 200 c.c. of sterile salt solution immersing only the bowls, shaking for 3 minutes, after which by the plate method the number of bacteria per spoon may be determined. This multiple spoon test for determining cleanliness and disinfection as a standard for all table utensils is simple, accurate, and dependable.

But there is another test of equal importance—it is the bacterial count per c.c. of the wash waters. A soapy solution may remove grease and visible dirt, but at the same time the washing of successive dishes adds to the bacterial count of the wash water until finally the contamination runs so high that the utensils may carry more organisms after, than before they were washed. And then too, when the wash water is heavily contaminated the hands of the operator carry a heavy load of bacteria, and this constitutes a hazard, not only to the operator but to the public as well, for the operator is frequently employed also in the preparation of food.

We then have two control factors: the multiple spoon test, as well as the test of the wash water. Both are important as regulatory factors for the protection of public health. While the work here reported is not final the aim has been toward developing a practical procedure of dish washing which would satisfy the bacterial tests for both the utensils and the wash water.

A number of different procedures were used and while utensils could be

CHART III.



HAND WASHING OF TABLEWARE
Showing consumption of chlorine by residual soap on dishes.

TABLE I

Hours	Soapy Wash Bact. per c.c.	Soapy Rinse Bact. per c.c.	Chlorine Available	Spoons Bact. per Spoon
1st	12,000	8,000	184.3	0
2nd	50,000	20,000	166.6	0
3rd	100,000	60,000	141.8	2
4th	120,000	100,000	88.6	0
5th	250,000	100,000	53.1	2

produced with a satisfactorily low count, the stumbling block to the operations was the high count in the soapy wash water. For instance, as shown in Table I, during a 5 hour run by the four compartment method, the bacterial count of the soapy wash water in compartment 1 at the start was 12,000 per c.c. and at the end 250,000 per c.c. The count of the soapy rinse water in compartment 2 used to free the utensils of soap before immersion in chlorine rose from 8,000 bacteria per c.c. to 100,000 per c.c. The exposure of the utensils in 3, the chlorine compartment, was 5 to 7 minutes. The available chlorine in this run was 185 p.p.m. at the start and 53 at the finish. The object of the clear water rinse compartment 4 is to free the utensils of chlorine odor and taste. This is necessary when the dishes are immediately used after washing, but only when the inorganic compounds are used. By the multiple spoon test the utensils appeared to be satisfactorily disinfected; viable organisms having been found at the end of the 3rd and 5th hours only.

As far as the disinfection of utensils by the multiple spoon test is concerned, Table I presents almost perfect results, but the soapy and rinse waters are highly polluted, a hazard to the public through the operator, who not only washes the dishes but prepares food.

In order to meet the requirement of low bacterial counts in the soapy wash water it was chlorinated, and the chlorine consumption and bacterial counts were determined. Of the many runs by this procedure two are presented: an organic chlorine compound being used in Table II, and an inorganic one in Table III.

While there is a marked difference in the consumption of chlorine in the soapy wash of the two experiments here presented, it is to be pointed out that this is no criterion as to regularity of chlorine consumption in the numerous experiments performed in this series. The tables are selected at random and merely to indicate the system of operation.

In the soapy wash solution the chlorine is consumed by the fatty acid

TABLE II

	Soapy Wash			Chlorine Solution	
Hours	Av. Cl.	Bact. per c.c.	Bact. per Spoon	Av. Cl.	Bact. per Spoon
1st	195	5	0	205	0
2nd	121	18	100	196	120
3rd	118	40	0	173	300
4th	63	13	400	152	0
5th	202	3	0	134	60
6th	188	8	60	119	700
7th	168	7	20	117	20
Cl. consumed	165	94	580	88	1,200

TABLE III

	Soapy Wash			Chlorine Solution	
Hours	Av. Cl.	Bact. per c.c.	Bact. per Spoon	Av. Cl.	Bact. per Spoon
1st	323	10	30	313	2
2nd	50	3	40	302	0
3rd	140	15	0	295	0
4th	14	250	400	182	0
5th	7	200	760	159	0
6th	205	500	860	145	0
7th	32	200	320	130	0
Cl. consumed	579	1,177	2,410	183	2

radicle of the soap and the organic food substances. We have found that there is a wide variation in the chlorine consumption not only by different soaps, but as well by the same soap under different conditions, and presumably different foods in large or small quantities consume variable amounts. Then too there is not only the consumption of chlorine but as well the pH of the solution as affected by the wide variation in the alkalinity of soaps, the pH in turn influencing the germicidal properties of the chlorine.

As shown in Tables II and III, the amount of organic chlorine preparation consumed was only about one-third that of the inorganic preparation, but as previously pointed out, the availability of germicidal chlorine in the field of action is important. This availability of germicidal chlorine has two extremes in the several chlorine preparations: in the organic least available, in the alkaline inorganic most available. The one is not readily consumable, the other easily broken down into its end product oxygen, and immediately available in abundance for quick action.

DISCUSSION

That there is need for a higher standard of eating utensil sanitation in public eating places is indicated by the recent finding that 33 per cent of the organisms remain on the utensils after they are washed (soiled 150,000 and washed 50,000 bacteria per spoon). This percentage represents a cross-section of 46 different restaurants including both the better and poorer types.

If by the soapy water washing method dishes are to be disinfected by either machine or hand washing, they must be subjected to a scalding rinse. At the better places where there is watchful supervision and also an adequacy of scalding water, the disinfection is fairly satisfactory. By the mechanical method at carelessly supervised places the water at the start may be scalding, but by repeated use the temperature drops below the disinfection point. The water then becomes highly contaminated and the dishes carry an increasing load of bacteria. In machines so operated we have found the wash water to carry 300,000 organisms per c.c. and spoons contaminated to the extent of 120,000 bacteria per spoon. This is not the fault of the machine, but it is the entrance into the equation of the personal element. In general, the operators of these machines are unskilled and come largely from a floating population.

In those eating places using mechanical washers where there is insufficient scalding water the disinfection results

would be greatly improved by the use of an inorganic chlorine preparation in the rinse water.

So far, the most satisfactory, but not altogether practical, method for the cleansing and disinfection of utensils by hand is first to rinse off the organic food particles in running hot water, second to wash in an alkali cleanser as tri-sodium phosphate-chlorine solution, and third to immerse in a suitable chlorine solution. When all the dishes of the first set have been placed in the third compartment containing chlorine solution, they should remain there until the second set have reached the second compartment. Thus there is the necessary time exposure in the two disinfecting solutions of 8 to 12 minutes. The water should be maintained at hot hand washing temperature which is about 120° F.

While it is recognized that a chlorine solution will destroy most infectious organisms of the saliva-borne group, the question is still open as to whether or not under practical working conditions it renders the tubercle bacillus non-infectious. This question is of great importance and requires special research.

CONCLUSIONS

1. There is presented a method for determining the efficiency of disinfection of eating utensils by the multiple spoon-bacteriological test.

2. There is pointed out the importance of maintaining a low bacterial count in the wash water, thus securing better disinfection and eliminating a hazard to both dish washer and to the public.

3. The second or rinse water compartment of the mechanical washer may carry a chlorine solution as an additional measure of disinfection.

4. The two compartment procedure for washing beverage glasses, with either soap or alkaline detergent and chlorine in the first, and organic chlorine solution in the second, is satisfactory if the time exposure is sufficient for disinfection purposes. It being understood that the available chlorine in the first be not less than 200 p.p.m. in solution after saturating the organic matter of the soap with chlorine, and a minimum, at no time less than 50 p.p.m.

5. There is presented a procedure for washing dishes by hand, using a sink of three compartments, two of which contain chlorine. It is believed this procedure will give satisfactory disinfection results under practical working conditions. An extended test in the field is, however, necessary to prove its practicability.

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Biology of the Oyster in Relation to Sanitation*

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OWING to several anatomical and physiological features of the oyster, the sanitary control of the oyster industry presents certain difficulties not encountered in the handling and marketing of other perishable sea foods. An understanding of the biology of this mollusk seems indispensable for an intelligent application of the principles of sanitation to this highly specialized branch of the fish industry. The fact that great quantities of oysters are consumed raw and that, excepting its shell, it is eaten in its entirety, makes the question of what constitutes the oyster's food and how it is taken in of great practical importance. Because the mode of feeding of the oyster consists in straining great volumes of water through the gills and ingesting the microscopical suspended material, the purity of the meat is correlated closely with the organism's activity and the character of the water surrounding it.

The feeding of the oyster is controlled by at least 3 sets of organs: gills, mantle, and adductor muscle. The gill may be regarded as the most conspicuous organ of the lamellibranch body which, besides its primary respiratory function, has become a principal organ of feeding, comparable to a very complex sieve capable of filtering a large quantity of water. The synchronous beating of the ciliae covering the surface of the gill, forces the water through the pores into the epibranchial chamber (spaces above the gill lamellae) and into the cloaca. The rate of feeding is therefore entirely dependent upon the efficiency of the ciliated mechanism of the gill. The latter, however, is affected by physical and chemical changes in the outside environment which exert upon it either a stimulating or depressing influence. The filtering capacity varies with size, shape and condition of the organism, but in all the oysters it is controlled by the temperature. At a temperature of about 25° C. an adult oyster may filter as much as 7 liters of water per hour, the rate decreasing with a drop in temperature and at 7° C. activity ceases.

It is obvious that inhibition of ciliary motion results in a deficiency or complete cessation of feeding. This conclusion, made from the results of experiments, was fully corroborated by the author's observations during 3 years (1932–1935) on oysters in Long Island Sound. Stomachs and intestines examined at bi-weekly intervals were completely devoid of food and even no trace of crystalline style was found in the samples taken during the cold season when the temperature of the water was less than 7° C.

* Read at a Joint Session of the Laboratory, Food and Nutrition, and Public Health Engineering Sections of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

From the point of view of sanitation it is of interest to determine the efficiency of the oyster gills in removing bacteria from the water. Experiments (Galtsoff, 1928) carried out with oysters placed in water to which a known number of *B. coli* was added, show that only 30 per cent of bacteria are retained by the gills. Apparently these microörganisms are so small that they can pass easily between the cilia and escape back into the water.

The feeding of the oyster is also influenced by the length of time the shells remain open and by the position of the two mantles which, by coming together, may considerably reduce the amount of water sucked in by the gills. Hopkins (1931) has demonstrated in *Ostrea lurida* that it is not so much the existing temperature of the water which determines how long the shell remains open as it is the changes in temperature which control the behavior of the adductor muscle, and are therefore of far greater importance. Falling temperature causes the shells to close, while a rise in temperature is followed by opening. The length of time which oysters remain open depends upon several factors and varies in different localities. From the point of view of sanitary control it is of interest to mention that *Ostrea virginica* may slightly open its shell at 4–5° C. when no current is produced by the gills and consequently no food is found in the intestinal tract.

The oyster possesses a well developed chemical sense which permits the organism to react to changes in the water and detect the presence of small amounts of irritating substances. When a polluting substance is present the oyster protects itself by closing the valves and reducing the number of hours of feeding. Should these conditions prevail for a long time, growth is retarded, the flesh becomes emaciated, and increased mortality ensues. Investigations carried out on the effects of pulp mill pollution (Hopkins, Galtsoff, and McMillan, 1931) showed that death occurred more quickly among oysters which kept their valves open for a longer period of time, those surviving longer which considerably reduced the daily average number of hours during which their shells remained open.

The nutritive value of the oyster meat varies with the seasons and is influenced by the conditions under which it grows. From the nutritional point of view the quality of the oyster is determined by the per cent of solids, glycogen, mineral salts, and vitamin content of the meat. Only the first two factors have been subject to systematic investigation. Normally oyster meat contains about 80 per cent of water, being however, subject to wide fluctuations. Under certain conditions, it is rather difficult to establish a definite standard. Present regulations designed to prevent adulteration forbid putting oysters in water of lower salinity than that in which they were grown. Oysters are very tolerant of changes in salinity. They may thrive as well in water having about 10 parts of salts per 1,000 as in that with salinity ranging between 22 and 27. Moreover, the water content of the meat may vary independently of changes in salinity of the surrounding water. The author's observations show that the water content of oyster meats may increase from 80 to 88 per cent immediately following the shedding of eggs and sperm. As a rule oysters become watery after spawning although the salinity remains constant.

Early in the fall oysters begin to store glycogen, the content of which may reach as high as 12–14 per cent (fresh basis). This process is accompanied by an increase in solids and a corresponding decrease of water in the tissues. At this time oysters have

the highest nutritive value. With the onset of cold weather feeding ceases, though the glycogen content remains on a high level throughout the winter. This indicates that all the physiological activities are greatly reduced and that during the hibernating period the organism draws but little on the supplies stored in its tissues. It is remarkable that in spite of the complete cessation of feeding the growth of shell both in length and weight continues.

There is no information regarding the seasonal fluctuations in the contents of heavy metals and vitamins in oyster tissues, though there are sufficient data to show the existence of a definite correlation between the iron and copper content and their geographical distribution (Galtsoff, 1934). In general, oysters from the North Atlantic are poor in iron and rich in copper, while the reverse is true for the South Atlantic and Gulf States, the variation occurring gradually as we proceed along the coast from Rhode Island to Florida. This suggests that the observed changes are not incidental but may be due to differences in the chemical composition of water. Unfortunately our knowledge regarding the iron and copper metabolism in the oyster is too incomplete to justify further speculation regarding the significance of the observed facts.

An understanding of the salient biological features of the oyster may be useful to the public health officer in outlining and executing an efficient sanitary control of the oyster industry. One must bear in mind that the oyster is readily affected by changes in environment, and easily adapts itself to new conditions. In this respect it differs from other sea food and presents more difficulties from the point of view of sanitation.

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The Lag in Education

EVEN the more magnificent scientific discoveries, especially those of recent years, have not penetrated into our general education, and are entirely disregarded in most discussions of social problems. And yet an imposing accumulation of critical information of wide bearing is at our disposal which might become an active factor in the readjustment of the troubled relations of man were it possible to overcome the obstacles to its general dissemination and acceptance.—James Harvey Robinson, *Humanizing of Knowledge*, 1924.

A Rapid Slide Test for the Serological Diagnosis of Typhoid and Paratyphoid Fevers*

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ONE of us with Stuart [1] has described a rapid slide test using concentrated antigens with undiluted sera for the diagnosis of typhoid and paratyphoid fevers. The method proposed follows in general the Huddleson technic [2] for the diagnosis of Brucella infection, the efficiency and accuracy of which have been demonstrated by Lienhardt and Kitselman,[3] Palmer and Baker,[4] and Welch and Mickle.[5] The slide test for the diagnosis of typhoid and paratyphoid fevers makes use of 4 antigens: an alcohol treated *Eberthella typhosa* 'O', *Eberthella typhosa* 'H', *Salmonella paratyphi*, and *Salmonella schottmuelleri*. The antigens are about the consistency of thin cream and are prepared by growing large quantities of organisms on agar in Blake bottles and washing the growth off with concentrated formolized salt solution. All antigens are standardized by titration against known positive and negative sera the titers of which have been previously determined by a standard tube test technic. The test takes approximately 4 minutes to complete. The rapidity and ease with which it may be carried out routinely seemed to us to be an important factor in public health laboratories where speed and accuracy in reporting results to physicians are necessary. In hospitals where an early exclusion of typhoid in certain undiagnosed cases is often important, the rapid slide test should be invaluable.

It has become increasingly evident that some type of 'O' antigen should be included in the routine Widal test to obtain the most accurate interpretation of the agglutinins that are found in cases of suspected enteric disease. In the New York State [6] and Michigan [7] Departments of Health the value of the use of the 'O' type of antigen as well as the 'H' has been definitely shown. The investigations of Gardner,[8] Smith,[9] Craigie,[10] Wyllie,[11] Bole,[12] and others demonstrate the relationship of the 'O' and 'H' agglutinins in sera to vaccination and infection and further emphasize the importance of the 'O' agglutinin in diagnosis.

The method of preparation of our alcohol treated antigen (*E. typhosa* 'O') has been simplified. The method reported was as follows [1]:

Eberthella Typhosa Somatic 'O'—The same strain used in preparation of the flagel-

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* Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

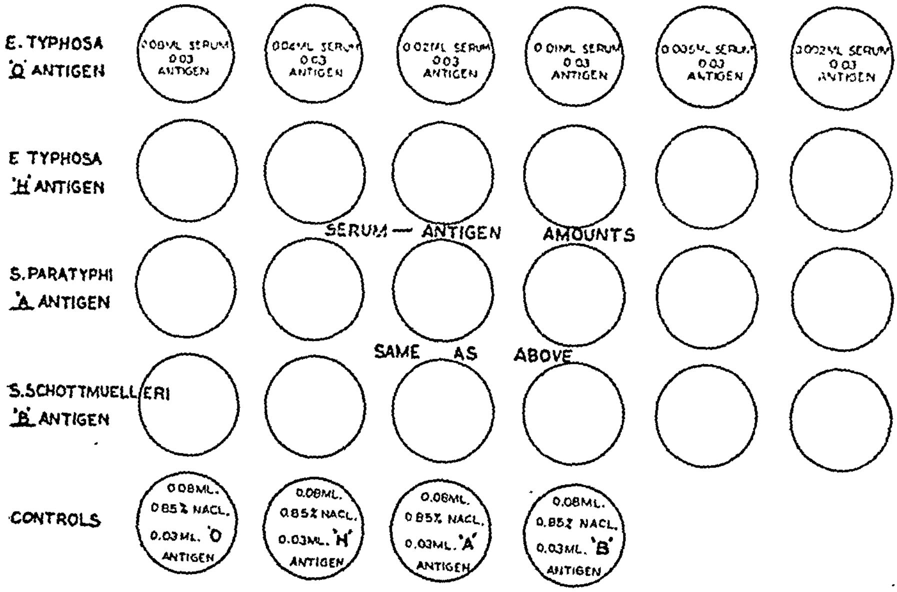
late (HO) antigen is used in making the 'O' antigen. The organisms are grown for 48 hours at 37° C. rather than for 24 hours and are washed from the surface of the agar with 12 per cent NaCl rather than with the formolized salt solution. After centrifugation the supernatant fluid is discarded and the packed bacterial cells are pooled using just sufficient 0.85 per cent salt solution for transfer purposes. This concentrated suspension is placed in a large flask and 15–20 volumes of 95 per cent alcohol is added, the flask shaken vigorously for 10 minutes and incubated at 37° C. for 24 hours. At the end of the incubation period the antigen appears as a flocculent white mass from which considerable of the alcohol may be siphoned and discarded. The remaining alcohol is removed by centrifugation. About 5–7 ml. of 12 per cent salt is added for each 1 ml. of packed bacterial cells and the concentrated suspension is ready for titration.

Instead of centrifugation to get rid of the supernatant fluid, after the organisms have been washed from the agar with 12 per cent formolized salt solution and pooled, 3 volumes of alcohol are added directly to the salt solution suspension of organisms. The flask is shaken vigorously for 10 minutes and incubated at 37° C. for 24 hours. From this point on the preparation of the 'O' antigen follows the original method. This modification saves 1 centrifugation without apparently affecting the efficiency of the final product.

Since our publication,[1] 1,100 sera have been studied with the rapid slide method, and the results compared with our standard tube test technic. The latter test makes use of live organisms as an antigen for the *Eberthella typhosa* 'H', *Salmonella paratyphi*, *Salmonella schottmuelleri* and an alcohol treated antigen for the *Eberthella typhosa* 'O'. All antigens are made to correspond to a turbidity of 6.9 on the Gates[13] apparatus. The serum is diluted 1:10 through 1:320 in a definite sequence and 0.5 ml. of antigen added to each dilution making the final dilutions 1:20 through 1:640. The tube tests are incubated at 52°–55° C. for 3 hours, followed by refrigeration over night. Final readings are made the following day.

FIGURE I

Showing Serum-Antigen Amounts Used in the Slide Test



METHOD

In the routine diagnostic slide test the patient's serum is pipetted onto a 5″ x 7″ glass slide in the following amounts: 0.08, 0.04, 0.02, 0.01, 0.005, and 0.002 ml. in the four rows of rings as shown in Figure I, using a Kahn pipette (0.2 ml. graduated in thousandths). In the fifth row (used only for the first test each day) 0.08 ml. of 0.85 per cent salt solution is added to each of the four rings for controls on each of the four antigens. A drop of 'O' antigen is added to each of the serum amounts in the first row and to the first ring in the fifth row. Similarly, a drop of 'H' antigen is added to each of the serum amounts in the second row and to the second ring in the fifth row. *S. paratyphi* is added to the third row and *S. schottmuelleri* to the fourth row, each with the appropriate controls in the third and fourth rings respectively in the fifth row. The above serum-antigen mixtures in each row correspond to dilutions of 1:20 through 1:640 in the tube test. All antigens are shaken gently but well before using. Each row of serum-antigen mixture is thoroughly mixed with a separate toothpick or applicator starting with the smallest amount (0.002 ml.) of serum and working from right to left. After mixing, the glass slide is gently rocked back and forth 15–20 times and the degree of clumping estimated. The type of agglutination obtained with the 'O' antigen does not correspond to the typical small flaking or granular agglutination obtained in the tube test, and hence 'O' and 'H' agglutination cannot be differentiated by appearance. This is no disadvantage since both types of antigens are used.

RESULTS

Of the 1,100 sera tested by both the slide and tube methods, 400 were sent to these laboratories for the Wassermann test, 200 of which were tested with the regular tube test technic and 200 by the New York State method. The results were compared with those obtained with the slide test on all 400 sera.* The results are given in Table I.

Since the Connecticut tube test technic did not make use of an 'O' antigen at the time this series of tests was begun, but used only a living, motile culture, the New York State 'O' antigen was used in testing all 400 sera listed in Table I. It will be noted that the percentage of reactions obtained with the first 200 sera (when using the New York State 'O' antigen with the Connecticut technic) were quite comparable with the percentage for the second 200 (where the New York State technic was followed), 12.6 per cent of the sera showing reactions in the first 200 sera and 15.5 per cent in the second 200. From an inspection of Table I it will be seen that in all instances with the exception of *S. paratyphi* 'A' antigen the slide tests showed a lower percentage of reactions than did the Connecticut tube test. This was particularly true in the case of the 'O' antigen. On the other hand, when compared with the New York State tube test a greater percentage of reactions was obtained with the slide 'H' antigen than with the New York State 'H'. However, the slide 'O' antigen again showed considerably fewer reactions when compared with the New York State tube test 'O'. It would appear that the slide test is slightly more specific than the Connecticut tube test method, and this would appear also to be true with the slide 'O' antigen when compared with the New York State tube test 'O', although the slide 'H' is definitely less specific when compared with the New York State tube test 'H' antigen. The degree of agglutination obtained with the New York State 'H' antigen was greater than the degree of agglutination obtained with the 'H' slide antigen in most instances.

Seven hundred * of the sera used to

* The New York 'H' and 'O' antigens used were kindly furnished by the New York State Laboratories at Albany, N. Y.

* The authors are indebted to Dr. M. H. McCrady, Montreal, Que., to Dr. J. G. McAlpine, Montgomery, Ala., and to Esther Brintzenhoff, Providence, R. I., who kindly furnished us with some of the sera used in these studies.

TABLE I

SLIDE TEST RESULTS ON 400 WASSERMANN SERA, 200 COMPARED WITH CONNECTICUT TUBE TEST AND 200 WITH THE NEW YORK STATE TUBE TEST

Number of Sera	Method	Percentage Reactions With Antigens H	O	A	B
200	Conn. Tube	48.0	12.6[1]	9.5	61.0
	Slide Test	36.0	0.1	10.5	43.5
200	N.Y.S. Tube[2]	32.5 *	15.5 *	....	....
	Slide Test	42.5	8.5	....	....

* The New York antigens were kindly furnished by the Division of Laboratories and Research of the New York State Department of Health.

[1] Using New York State antigen with Connecticut technic.

[2] As nearly as possible the New York State method was followed throughout.

make comparisons between the tube and slide technics were sera sent for the routine Widal test. One hundred, or 14.4 per cent, were from known cases of typhoid or paratyphoid fevers demonstrated clinically or by isolation of the etiological agent. Fifty, or 7.1 per cent, were from individuals known to have had vaccine. Two hundred and sixty sera, or 37.1 per cent, showed partial reactions by one or both tests and 290, or 41.4 per cent, showed no reactions with either test.

In Table II are summarized the results obtained in a comparison of the tube and slide tests on sera from 100 cases, 73 of which were cases of typhoid fever and 27 cases of paratyphoid B. With the typhoid sera the slide test gave fewer negative results with both the 'O' and 'H' antigens than the tube test with these antigens. This greater degree of sensitivity of the slide test is reflected in the cross-reactions obtained with the 'A' and 'B' antigens since the slide test showed fewer completely negative results than did the tube test with these antigens. The cross-reactions obtained with the 'A' and 'B' antigens in the slide test were usually slight reactions in the first 2 dilutions. This is shown in the higher percentages of reactions obtained with the 'A' and 'B' antigens in the 1:20 and 1:40 dilutions. A higher percentage of reactions was obtained in the 1:320 dilution with the tube 'O' antigen (62.5 per cent) than with the slide 'O' antigen (47.9 per cent). On the other hand, the reverse of this is true with the 'H' antigens (tube test 42.5 per cent and slide test 66.6 per cent).

With the sera from 27 cases of paratyphoid B (Table II) both tests failed to show agglutination with the 'B' antigen in 11.1 per cent of the cases. A diagnosis of these cases was made by isolation of the organism. Cross-agglutinations with the 'O' antigen in the slide test were obtained in the same percentage (59.3 per cent) of cases as with the 'H'. Fewer cross-reactions with the 'O' and 'H' antigens were obtained in the tube test ('O' 23.8 per cent; 'H' 37.0 per cent). This was not true with 'A' antigens since the tube 'A' showed reactions in 44.5 per cent of the paratyphoid B cases, whereas the slide 'A' antigen showed cross-reactions in only 25.9 per cent. A higher percentage of reactions was obtained in the 1:320 dilution with the slide 'B' antigen than with the tube 'B' antigen in known paratyphoid B cases. In general, the results obtained on the sera from the paratyphoid cases are similar to those obtained on the sera from the typhoid cases (Table II).

In Table III are given the results obtained on 50 sera from known vac-

TABLE II

COMPARISON OF TUBE AND SLIDE TEST REACTIONS ON SERA FROM 100 CASES OF TYPHOID AND PARATYPHOID FEVERS

Positive Reactions by Dilutions on 73 Cases of Typhoid Fever

	Per Cent Negative	Per Cent Positive, by Dilutions 1:20	1:40	1:80	1:160	1:320
Tube O	14.5	2.0	6.2	12.5	2.0	62.5
Slide O	8.2	2.7	9.5	9.5	21.8	47.9
Tube H	4.1	1.3	6.9	39.8	5.4	42.5
Slide H	2.8	1.4	4.1	8.3	16.5	66.6
Tube A	67.6	5.0	7.5	7.5	5.0	7.5
Slide A	55.2	7.4	11.9	11.9	7.4	5.9
Tube B	41.8	4.4	13.4	11.9	19.4	8.9
Slide B	34.8	14.5	20.2	13.0	5.8	11.6

Positive Reactions by Dilutions on 27 Cases of Paratyphoid B

	Per Cent Negative	Per Cent Positive, by Dilutions 1:20	1:40	1:80	1:160	1:320
Tube O	76.2	0	9.5	0	14.3	0
Slide O	40.7	0	11.1	29.6	7.4	11.1
Tube H	63.0	7.4	7.4	11.1	7.4	3.7
Slide H	40.7	0	11.1	25.8	7.4	14.8
Tube A	55.5	22.2	11.1	11.1	0	0
Slide A	74.1	0	3.7	11.1	11.1	0
Tube B	11.1	0	7.4	7.4	29.6	44.4
Slide B	11.1	0	11.1	7.4	7.4	63.0

cinated individuals. The 'H', 'A', and 'B' agglutinins predominated in this vaccinated group although some reaction was obtained with the slide 'O' antigen in 40 per cent of these sera and with the tube 'O' antigen in 44.3 per cent. It will be noted in connection with this that 4 per cent (2 sera) showed a reaction in the 1:320 dilution in the 'O' antigen of the slide test. These sera were obtained from recently vaccinated individuals, which probably accounts for the high titered 'O' agglutination. In the older vaccinated individuals 'O' agglutinins rarely appeared and when present were found only in low dilutions. The percentage of reactions obtained with the 'O' antigen in the vaccinated group is slightly higher than that reported by

TABLE III

COMPARISON OF TUBE AND SLIDE TESTS ON SERA FROM 50 VACCINATED INDIVIDUALS

	Per Cent Negative	Percentage Reactions by Dilutions 1:20	1:40	1:80	1:160	1:320
Tube O	55.7	7.4	22.2	11.1	3.7	0
Slide O	60.0	10.0	16.0	4.0	6.0	4.0
Tube H	8.0	2.0	24.0	22.0	22.0	22.0
Slide H	6.0	0	12.0	18.0	18.0	46.0
Tube A	72.6	8.1	10.8	8.1	0	0
Slide A	40.0	4.0	18.0	26.0	10.0	2.0
Tube B	24.0	12.0	14.0	26.0	14.0	10.0
Slide B	18.0	0	22.0	12.0	34.0	12.0

Bole.[12] It would appear from the results obtained in the vaccinated group that the use of all 4 antigens (O, H, A, and B) in the Widal test is extremely helpful in separating the vaccinated individuals from those with known typhoid fever. In general, the results obtained with the tube test and slide tests in the vaccinated group are comparable, although, with the exception of the 'O' antigen, a greater degree of sensitivity was demonstrated with the slide test.

Partial reactions were obtained by one or both tests in 260, or 37.1 per cent of the 700 sera examined. These reactions were usually ++, +, or ± results in the 1:20, 1:40 or 1:80 dilutions although occasionally reactions were obtained in higher dilutions. Twenty-nine sera in this group showed slight reactions in the slide test with no reaction in the tube test, and 47 showed reactions in the tube test which were negative in the slide test. The remaining 184 sera in the questionable group gave partial reactions with one or more of the antigens in both tests. Since in none of the individuals, from which these 260 sera were obtained, was it possible to demonstrate typhoid or paratyphoid fever it would appear that the slide test was slightly more specific. From the results obtained by both tube and slide tests with these questionable sera it appeared that vaccine had been administered previously to some individuals although no definite history was obtained.

The remaining 290, or 41.4 per cent of the 700 sera, received for the Widal examination gave complete negative results with both tests.

DISCUSSION

The large amount of work that has been done in recent years on the standardization of the Widal test and the interpretation of results has made it evident that the use of an 'O' antigen as well as an 'H' is necessary for the serological analysis of a suspected serum. However, even though an 'O' antigen is used, the widespread inoculation with typhoid-paratyphoid vaccine as well as the number of cases of previous enteric infection, both of which stimulate the production of agglutinins for the typhoid-paratyphoid group of organisms, lowers the specificity of the Widal test regardless of the method. No Widal test is infallible and it is not likely that any will be developed that will lower the validity of the isolation of the etiological agent. Although in some cases of typhoid and paratyphoid fevers isolation of the causative organism is made several days before agglutinins are demonstrated in the serum of the patient, in a large number of cases it is not, and agglutination tests are necessary. The value of the Widal test is dependent upon the standardization and maintenance of antigens that will give consistent results.

In the development of the slide test considerable emphasis has been placed upon the preparation of antigens which will give consistent results over several months. The standard tube test, used in these laboratories for several years, although ordinarily giving consistent results, requires considerable work to maintain smooth cultures and antigens which will not vary in their reactions. It has been necessary in using this method to standardize antigens daily (living cultures) and to check organisms for smoothness every 3 weeks. This standard tube test method was shown to be the most efficient when compared with 5 others by Moore.[14] The slide test antigens were standardized as nearly as possible against the antigens used in our tube test.

In general, in the study of 1,100 sera, the results obtained with the slide test compared very favorably with the results obtained with the standard tube

test. The slight differences in the specificity and sensitivity do not appear to be significant. In known cases of typhoid fever the slide test showed fewer complete negative results with the 'O' and 'H' antigens while in the 23 cases of paratyphoid B reported both the slide and the tube test showed exactly the same percentage of negative results. In these cases of paratyphoid B the organism was isolated early in the course of the disease before agglutinins could be demonstrated.

In the investigation of the rapid slide test our main interest has been to develop a test which would give us as consistent results as our standard tube test. We feel that this result has been realized with the technic presented, and that a marked saving in time, glassware, and material has been obtained. The slide antigens give consistent results for at least 5 to 6 months, which is a distinct advantage over our tube test method which requires frequent time consuming standardization. The fact that the slide test results on a serum may be obtained within a few minutes after it is received in the laboratory is a distinct advantage over the tube test technic which usually requires 15–24 hours to complete. We have found also that it is possible to standardize the slide test antigens within reasonable limits to other tube test technics. This should be an advantage to laboratories that are completely satisfied with their tube test technic, but desire to obtain results on suspected sera in a shorter interval of time.

In a comparison of the New York State tube test technic with the slide test on 200 Wassermann sera excellent agreement was obtained in spite of the fact that the slide test antigens were not standardized against the New York State antigens. Similar results were obtained with the 80 sera kindly sent to us by Dr. McCrady who had used the Dreyer technic in the analysis of these. In this group of 80 sera only 3 showed disagreement in results, and in 2 of these 3 the results obtained were sufficiently clear-cut in both tests to establish a diagnosis.

It would appear to us that the slide test proposed should be an excellent one for routine diagnostic purposes in public health laboratories where speed and accuracy in reporting results to the physicians are necessary, as well as in hospital laboratories where exclusion of typhoid in certain undiagnosed fevers is often important.

SUMMARY

A rapid slide test for the diagnosis of typhoid and paratyphoid fevers is presented which requires approximately 4 minutes to complete. The results obtained in a study of 1,100 sera indicate that the slide test is at least as sensitive and specific as the tube tests with which it was compared. The stability of the antigens used, the speed and accuracy with which a serum may be analyzed by this method, and the consistency of the results obtained, indicate that the test should be an excellent one for use in public health laboratories and in hospitals where an early exclusion of typhoid fever in certain undiagnosed cases is often important.

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Aluminum in Food

PROPAGANDA as to possible dangers resulting from the use of aluminum cooking vessels is so persistent that one suspects ulterior motives in its background. The problem has been investigated at various times, and in the presence of a renewed criticism of the widespread employment of aluminum vessels another recent study of the subject has appeared under the auspices of the British Ministry of Health. (Monier-Williams, G. W.—*Aluminum in Food*, Report 78 on Public Health and Medical Subjects, London, Ministry of Health, 1935.) The accurate determination of aluminum in food and biologic material, according to Monier-Williams, who wrote the report, is a difficult matter. The amount usually present is small and cannot easily be separated completely from iron and other metals. The method that has finally been adopted depends on the precipitation by 8-hydroxyquinoline and, although considerably longer than some of the colorimetric methods, has the advantages that it is applicable over a wide range of aluminum content and that the aluminum is obtained in a form in which it can be weighed or titrated. The figures for the amount of metal taken up by food from aluminum vessels vary considerably, owing to different conditions of experiment. Distilled water, whether hot or cold, has almost no action. Hard waters, however, corrode aluminum slightly and the same is true of organic acids. Aluminum is readily acted on by alkalis, and cooking utensils are therefore liable to be damaged if cleaned too often with soda. The problem of whether or not aluminum is injurious in moderate doses involves a number of different questions. It is probable that a considerable proportion taken into the stomach is soluble. Whether it can diffuse through the walls of the intestinal tract and get into the blood is a matter of further controversy, and at present judgment on this matter must be suspended. Aluminum salts in doses that are not unreasonably high have been shown to have some action on digestive processes.

There is no convincing evidence, however, that aluminum in the amounts in which it is likely to be consumed as a result of the use of aluminum utensils has a harmful effect on the ordinary consumer.—*J.A.M.A.*, Jan. 18, 1936, p. 218.

An Epidemic of Dengue*

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THERE has been some general information about the epidemiology of dengue for a considerable time, but it is only since the epoch making work of Siler, Hall, and Hitchens [1] that we have had exact information regarding the transmission of the disease. The first accurate descriptions of dengue were by Brylon of Java in 1779, and by Benjamin Rush of Philadelphia in 1780.[2] Reference to transmission by mosquitoes was made by Graham, of Beirut, Syria, in 1903.[3] For a long time it was thought that some such variety of culex as the *quinquefasciatus* or *C. fatigans* was the principal transmitter, a point which was not cleared up until the researches of Siler and his coworkers in the Philippines, and later confirmed by Simmons, St. John, and Reynolds.[4]

With the above facts established, the control of an epidemic is made possible through a systematic anti-larval campaign, *i.e.*, preventing the full development of mosquito larvae of the species which has been proved to be a carrier of the disease. Inasmuch as Siler's work definitely incriminated the *Aëdes aegypti* (formerly known as the *Stegomyia fasciata*), a mosquito which is in this country the only known carrier of yellow fever, the control will consist of the same procedure as employed in control and suppression of an outbreak of yellow fever.

There are some points wherein the two diseases differ: Mortality in dengue is very low, by some given as from 1 in 5,000 to 1 in 1,000, while in yellow fever 10 per cent has been regarded as a low death rate. Among my series of 478 cases on the coast of Peru on which history was available,[5] the mortality was 40 to 41 per cent. Among white Europeans in West Africa it seemed to run as high as 66 per cent. The second important point of difference lies in a lasting immunity following an attack of yellow fever, while in dengue there appears to be a short immunity, and not of uniform occurrence at that. Immunization by an attack becomes an important item in shaping a campaign for the control of an epidemic. It will make a considerable difference in the required critical index of mosquito production. In yellow fever the critical index may be said to be the percentage of mosquito production which permits the propagation of the disease. The index will vary according to the number of immunes in the population, *i.e.*, the infected mosquitoes may feed on immunes and die before taking another blood meal. The greater the number of immunes in a population, the easier it will be to stop the epidemic. Under such conditions the epidemic will cease while the mosquito incidence is still high. If there are few or practically no immunes, the mosquito production must be brought to a very low level. Owing to the low immunity production in dengue the mosquito incidence, *i.e.*, the production

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index, would have to be brought close to a relative zero.

An epidemic of dengue can best be discussed by referring to the sequence of events in a locality where such an epidemic has occurred. When we received word from Dr. George MacDonnell, Health Officer of Miami,[6] that he had found a number of cases of dengue, we at once thought of the possibility of its spreading to other points in the state, and eventually throughout the whole South.

It appears that epidemics of dengue occur periodically at intervals of from 8 to 10 or 12 years. This is rather interesting when one considers the evanescent nature of the immunity conferred. In the past there had never been a systematic anti-aegypti campaign for the control of dengue. Our effort in Florida in 1934, in so far as I know, was the first attempt to control and wipe out an epidemic of dengue by anti-larval methods. Dr. MacDonnell put on a force of 50 inspectors for the city of Miami, and also exercised some supervision of the suburban areas. The writer, with the assistance of Dr. T. H. D. Griffitts, of the U. S. Public Health Service, made a tour of the principal cities in the southern part of the state, urging the adoption of a clean-up campaign to stop the breeding of the *A. aegypti* as the surest safeguard against the appearance of dengue in the community. A town or city which does not have adult *aegypti* cannot have dengue. I was anxious to demonstrate that an epidemic of this nature could be confined to the state where it originated. To do so required prompt and energetic measures. One of the difficulties encountered was the lack of experienced personnel. One must learn the habits of the mosquito before effective inspection can be made. In many places relief labor was relied upon, as in Tampa, where in spite of several weeks of inspection many new cases of dengue were reported. On checking the areas which had been reported free of *aegypti* by the relief workers, we found the breeding profuse, and many adult mosquitoes on the wing. It became necessary to send in several trained inspectors to supervise the work and to train personnel, in order to insure a prompt reduction in *aegypti* production.

I wish again to call attention to the need for a low index of breeding or production of *aegypti* before one can hope to control an epidemic of dengue. Our work in Florida last year served as a demonstration of what must be done to control an epidemic of a disease which is propagated by container-born mosquitoes. The *aegypti* is a species which in nature breeds only in artificial containers, and then preferably near or within human habitation.

The appearance of dengue also served to awaken the people to a realization of the universal distribution of the vector of both dengue and yellow fever. The belief had been general that there were not enough *aegypti* on the wing to make possible the spread of an epidemic of yellow fever, and that should some cases appear we would be able to stop the epidemic promptly. Dengue control was further complicated by the irregularity with which inspection personnel could be obtained. The majority of communities used relief labor for this purpose, and the almost daily shifting of personnel resulted in a surplus of untrained as well as uninterested labor. The results of such inexpert inspection were often *nil*, or worse, in that the authorities then had a false sense of security. Checking the breeding in reportedly inspected areas, we found larvae and pupae galore.

It was difficult to determine the extent of the epidemic. We did not have a sufficient number of trained physicians to visit all the reported cases. Most of the mild cases were never seen by a physician; hence the ratio of cases to

the actual number reported was thought to be about 10 to 1. On the other hand, the fact that dengue had been proved to exist caused many questionable cases to be reported as dengue which otherwise would have been reported as something else. It is also true that the announcement of an unusual disease will sometimes result in enough reported cases to simulate an epidemic, if there is not an adequate medical force to investigate and correct the reports. Griffitts [7] shows a distribution of the towns reporting dengue. Many of these reported only 1 case, and the probability is that in some instances there was no dengue, while in others there may have been the estimated 10 cases for each 1 reported. In Griffitts's analysis of the ages of the sick it was found that all age periods from 1 year up to 70 were represented. This is as it should be in a disease which does not confer a lasting immunity. In contrast I can cite the incidence of yellow fever in the Peruvian epidemics of 1918 to 1921,[5] in which most of the cases occurred in individuals under 30 years of age, among those who were native to the territory affected. It was found that those older, who contracted yellow fever, had come into the area after the last epidemic, which occurred from about 1895 to 1897.

In a study of immunity in dengue by Sharp and Hollar [8] the conclusions point to a transitory immunity, and to the fact that it does not regularly follow an attack. Suggestions are also to the effect that there may be a strain specificity. The duration of immunity is thought to vary from 1 to 4 years.

In Greece the mortality was reported to be high, but a close analysis indicated that it occurred among elderly people and those with chronic disease. In such instances it is a question whether the mortality should be charged to dengue other than as a contributory factor.

CONCLUSION

The recent epidemic in Florida is thought to be the first in which a serious attempt was made to control dengue through anti-larval methods. If no effort had been made it is believed that there would have been a general epidemic over the entire South like that of 1922.

In controlling dengue by anti-larval work it will require a lower index of breeding than it does to control an epidemic of yellow fever.

Immunity in dengue is irregular while in yellow fever it appears to be universal and permanent. Herein lies an important factor in the mosquito control of the two diseases.

Trained personnel with a knowledge of the habits of mosquitoes is necessary for the control of any mosquito-borne disease, and especially for the control of dengue.

While it is the same mosquito which carries both yellow fever and dengue, it requires a more intensified destruction of breeding places to control and wipe out an epidemic of dengue than it does to wipe out an epidemic of yellow fever.

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Detection and Significance of Escherichia coli in Commercial Fish and Fillets*

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THE use of marine fish as food has increased tremendously in recent years. Better distribution facilities, increased advertising, and the general recognition that fish is a nutritious food and an important source of essential minerals, have all contributed toward popularizing fishery products as a regular part of the diet.

Changes in the methods of handling and marketing certain marine fish have occurred coincidently with their increased use. Formerly very little fresh fish was sold except "in the round," *i.e.*, as caught, or else eviscerated. A large proportion of the catch of cod, haddock, and hake was eviscerated, split, salted, dried, and sold as dried salt fish or "fish flakes."

Today a large proportion of the fresh or frozen fish is "packaged," that is, it is sold prepared either as fillets or in other ready-to-use form. According to the statistics of the U. S. Bureau of Fisheries,[1] 49,000,000 lb. of fish, chiefly haddock, valued at about $5,500,000, were sold as fresh or frozen fillets in 1933. The fish are usually caught by otter trawls, hand lines, or purse seines, and are eviscerated on the vessel, packed in ice in bins or cribs, and brought to port. After being sold to commercial dealers the fish are washed, scaled, and filleted. The fillets are washed, usually in a salt brine, wrapped in parchment, and those sold fresh are packed in 10 and 25 lb. quantities in tin boxes, which in turn are packed in ice for retail shipment.

So much handling, between catching and purchase by the consumer, naturally increases the chances of contamination and the rapidity of subsequent spoilage, particularly in fillet form.

Laboratory tests for the sanitary quality of various food products have come into wide use. However, the bacteriological examination of marine fish has not become common and there are no standard methods for such examination.

There are two possible standards on which the quality of market fish might be based; one the total bacterial count on the fish flesh, and the other the detection of some specific type of bacteria, such as *Escherichia coli*, sanitary significance of which could be interpreted.

REVIEW OF LITERATURE

The majority of investigators agree that the flesh of live fish and of freshly

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caught fish is sterile. Hunter[2] and Fellers[3] found that the digestive tract and flesh of migrating salmon was usually sterile. Proctor and Nickerson,[4] in examining the flesh of 96 fish, frozen with dry ice immediately upon being caught, and examined upon reaching the laboratory, reported all except one sample to be sterile.

The slime of fish is not sterile and, after the death of the fish, serves as an excellent medium for the rapid multiplication of bacteria. Gee[5] made isolations from slime of live haddock and found numerous organisms. Stewart[6] examined the slime content of 22 haddock. Of the 247 cultures isolated, 140 corresponded in general characteristics with the genus Achromobacter. Organisms of the mammalian intestinal type were not found, and only 4 cultures belonging to the genus Aerobacter were isolated.

All investigators agree that bacterial invasion of the flesh occurs soon after the death of the fish. The number of organisms present and the rate of spoilage depend on several factors, temperature of storage and carefulness of handling probably being most important. Griffiths and Stansby[7] in studying the correlation between chemical and bacterial tests for freshness of fish flesh found that with market haddock, caught from 4 to 10 days, the bacterial count was between 10,000 and 100,000 per gm., while counts of 500,000 to 1,000,000 were typical of very stale and unmarketable fish. The maximum period during which haddock stored in ice could be kept in an edible condition was between 16 and 21 days. Fillets, because of their greater initial contamination, spoil more rapidly.

Because of the public health significance of *Escherichia coli* in water and foods as an indication of potentially dangerous contamination, the possibility of its occurrence in the intestinal tract of lower animals and of fish has been investigated. Gibbons[8] in a review of literature and as the result of his own investigations concluded:

> *E. coli, E. communior* and *A. aerogenes* are not normal inhabitants of the intestinal tract of marine fishes. Representatives of the genera Escherichia and Aerobacter may be found in marine fishes, but they seldom occur in fish taken some distance off-shore. The fecal forms are particularly rare, except in fish taken near shore or in contaminated waters.

Griffiths[9] did not find fecal *Escherichia coli* in the slime or flesh of fresh haddock, but found typical fecal *E. coli* on 5 commercial fillets examined. Hunter[10] considered the presence of *E. coli* in cooked crab meat an indication of contamination due to faulty handling.

PURPOSE OF THE PRESENT INVESTIGATION

It was the purpose of the present study to investigate the occurrence of bacteria of the coli-aerogenes group on market fillets and whole fish, and to determine the proportion of these organisms which could be identified as fecal (mammalian) *Escherichia coli.*

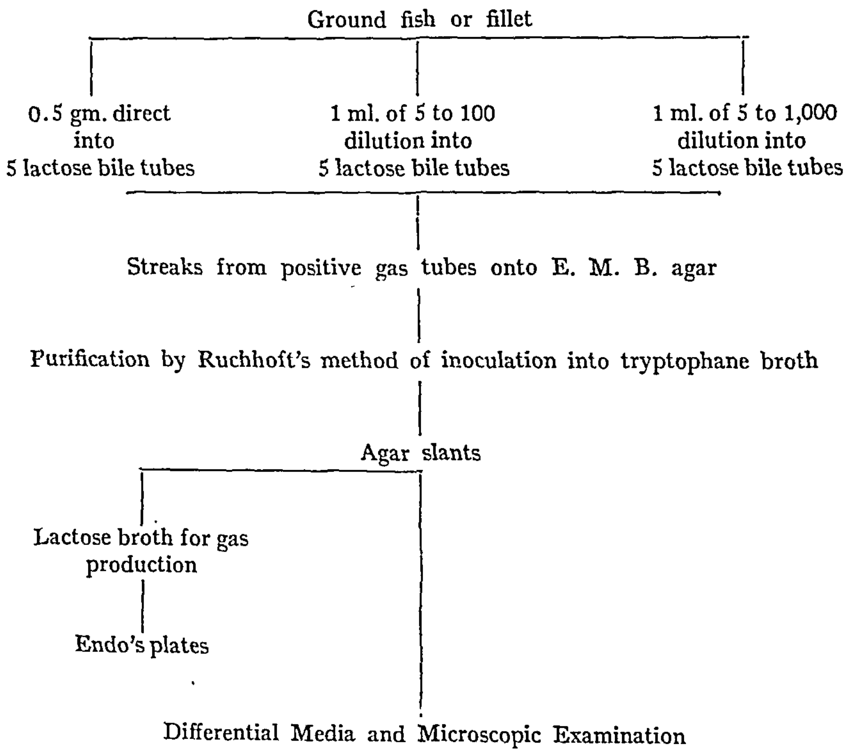
METHOD OF INVESTIGATION

Fish and fillets were purchased from retail stores. The fish were carefully filleted in the laboratory and both the laboratory and the store fillets were skinned. The flesh was then ground twice through sterile meat grinders into sterile pans, and 5 gm. portions were weighed into dilution bottles containing 99 ml. of sterile water for a 5 to 100 dilution. After being in a mechanical shaker for 10 minutes, 10 ml. were added to 90 ml. of sterile water to make a 5 to 1,000 dilution. Five tubes of lactose peptone brilliant green bile broth were inoculated with 0.5 gm. portions of the ground fish, 5 tubes with 1 ml. of the 5 to 100 dilution, and 5 tubes with 1 ml. of the

5 to 1,000 dilution. After incubation at 37° C. for 48 hours, the number of gas-positive fermentations was noted and streaks from these tubes were made on eosin-methylene-blue agar plates. E.M.B. agar plates were used because they are believed to be slightly more selective than Endo's agar. After 24 hours, incubation colonies most resembling *E. coli* were picked and inoculated into lactose broth fermentation tubes. Those which failed to referment were classified as false presumptives, and discarded. From the positive tubes streaks were made upon Endo's medium to determine colony characteristics and insure the purity of the culture. Agar slants were made and saline suspensions from these used to inoculate tryptophane broth, Clark and Lubs medium, sodium citrate, and uric acid tubes. Readings were made

FIGURE I

DIAGRAM OF PROCEDURE AND CLASSIFICATION OF ORGANISMS



Classification

	Endo's	*V.P.*	*M.R.*	*Na. citrate*	*Uric Acid*	*Indol*
Escherichia coli	T	—	+	—	—	+
Intermediates						
a. coli-like	At	—	+	—	—	±
" "	T	—	+	+	—	±
b. indeterminate	?	?	?	?	?	?
c. aerogenes-like	T	+	+	+	+	+
Aerobacter aerogenes	T	+	—	+	+	—

At—not typical for *E. coli*
Indeterminates—various combinations of reactions not included elsewhere in the chart.

at 24 hours for indol production, and at 48 hours for the other tests except the methyl red reaction, which was determined after 96 hours' incubation. An organism was considered to be of fecal type if it was a Gram-negative rod producing typical *E. coli* colonies on Endo's medium, producing indol, and was methyl red positive, Voges-Proskauer, sodium citrate, and uric acid negative.

Twenty fillets purchased at intervals from May to August yielded 203 cultures producing gas in brilliant green lactose peptone bile broth in the primary inoculations. After repurification 181 of these refermented lactose, and of this number 60 were typical, according to the previous definition, of fecal *Escherichia coli.* Four of the 20 fillets did not show evidence of any typical fecal *Escherichia coli.* Five eviscerated haddock purchased during the same period yielded 44 gas positive tubes; 40 refermented lactose, and 4 were typical of fecal *E. coli.*

Brilliant green lactose peptone bile broth was used instead of the usual lactose broth because it was believed that this medium was more selective for organisms of the Gram-negative, lactose-fermenting type. From 6 fillets, where duplicate tubes were set up, lactose broth yielded 46 gas positives from which 10 typical *E. coli* were isolated, and brilliant green lactose peptone bile broth gave 54 positive gas tubes from which 17 typical *E. coli* were isolated.

False presumptive tests from the two sets of broths were about equal in frequency of occurrence. These apparent false presumptives may have been due to either the loss of the gas-producing organism on transfer, or to a non-colon type of symbiosis in the original direct inoculation.

Brilliant green lactose peptone bile broth alone was used for the remainder of the fillets. Table I shows the distribution of positive gas tubes from the dilutions of the fillet and fish.

The majority of isolations and the fewest false presumptive tests were obtained from the primary inoculation of 0.5 gm. flesh. The number of samples run is not large enough to consider this difference conclusive. Positive 5 to 1,000 tubes were obtained from 11 of 17 fillets and from only 2 fish.

Table II shows the distribution according to the 6 criteria mentioned of all the Gram-negative lactose-fermenting organisms isolated.

Of the cultures isolated from fillets, 60, or 30 per cent, were typical of fecal *E. coli.* From whole fish only 4 typical *E. coli* were isolated and the proportion of intermediates was higher. Gas pro-

TABLE I

DISTRIBUTION OF POSITIVE GAS TUBES AND ESCHERICHIA COLI FROM FISH AND FILLETS

	Fillet Sample No.																				*Fish Sample No.*				
Dilution	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	1	2	3	4	5
Flesh, 0.5 gm.																									
Tubes positive	5	5	5	5	5	2	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Confirmed	5	5	4	5	5	2	5	4	5	4	4	2	5	5	5	5	5	4	4	5	5	5	3	5	5
E. coli found	4	5	1	0	1	0	2	2	4	2	1	1	2	3	0	0	3	2	1	1	0	1	0	3	0
5 to 100 dilution																									
Tubes positive	5	5	5	2	5	1	1	5	5	5	5	5	5	3	5	5	3	1	4	3	3	3	0	4	5
Confirmed	5	5	1	2	5	1	0	5	5	5	4	1	5	2	4	5	2	1	3	3	3	3	0	4	5
E. coli found	0	2	1	0	1	0	0	4	3	0	2	0	1	1	0	0	0	0	0	0	0	0	0	0	0
5 to 1,000 dilution																									
Tubes positive	2	..	..	1	4	..	0	1	4	4	3	5	4	0	0	3	1	0	0	0	0	0	0	0	4
Confirmed	1	..	..	1	4	..	0	1	4	4	2	5	4	0	0	3	1	0	0	0	0	0	0	0	2
E. coli found	0	..	..	0	0	..	0	1	4	1	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0

TABLE II

CLASSIFICATION OF GRAM-NEGATIVE, LACTOSE-FERMENTING ORGANISMS ISOLATED FROM COMMERCIAL FILLETS AND FISH

	Flesh	5 to 100 Dilution	5 to 1,000 Dilution
Haddock Fillets			
Typical fecal *E. coli*	35	15	10
Intermediates—Coli-like	20	18	9
Indeterminate	26	23	8
Aerogenes-like	1	2	1
Typical *Aero. aerogenes*	4	7	2
False presumptives	9	12	1
Total number of cultures	95	77	31
Eviscerated Whole Haddock			
Typical fecal *E. coli*	4	0	0
Intermediates—Coli-like	4	3	0
Indeterminate	11	11	2
Aerogenes-like	2	1	0
Typical *Aero. aerogenes*	2	0	0
False presumptives	2	0	2
Total number of cultures	25	15	4

duction was seldom observed in dilutions of 5 to 1,000 of whole fish flesh. This would indicate that if treatment and handling were in any way related to the number of positive gas tubes, and to the type of organisms found, then the whole fish were considerably better in sanitary quality than were the fillets.

DISCUSSION

These experiments have demonstrated the presence of bacteria of the coli-aerogenes group on the flesh of commercial fillets and whole fish; and *E. coli* characteristic of mammalian feces was present on many of the samples examined, particularly on the fillets. Since the work of Gibbons, Fellers, and others has shown that *E. coli* is not usually found in, or on, marine fish from deep water, it follows that the fish and fillets most likely become contaminated with these organisms during handling. The process of making fillets involves the more extensive handling and consequently results in greater possibility of contamination; this is shown by the greater abundance of *E. coli* found on fillets than on whole fish.

The presence of *E. coli* in oysters and clams is used as an evidence of pollution, and if such pollution is sufficiently serious the products are condemned. The data presented indicate that many fillets, and some whole fish, purchased at random from public markets are contaminated, but a different use should probably be made of the information. The fact that fish are well cooked before they are eaten minimizes, and in most cases removes, any danger of illness resulting from this type of contamination.

A test for *E. coli* is probably better qualitative evidence of careless handling than a total bacterial count, and a test for this, and perhaps related organisms, might be used for educational purposes, among those engaged in bringing fish to the consumer, in the effort to improve the methods of handling and marketing.

The significance of members, other than *E. coli*, of the coli-aerogenes group, is a controversial subject. The *Standard Methods of Water Analysis* of the American Public Health Association considers the presence of members of the group to be sufficient evidence of pollution to justify condemning water. However, prominent investigators, particularly Levine,[11] Tonney-Noble,[12] and Koser,[13] insist that only *E. coli* are from feces and that other members of the group are of little, or no, sanitary significance. The authors of this paper are inclined to accept the latter view.

The investigation here reported does not represent a sufficient number of samples to make the results conclusive. It is the intent, rather, to offer this preliminary study as a suggestion to laboratories concerned with the studies of fishery products that the occurrence of *E. coli* on fish and fillets is worthy of wider study. It is hoped that methods may be devised for evaluating the sanitary quality of these fishery products.

SUMMARY

1. Twenty commercial haddock fillets and 5 eviscerated haddock were purchased from local retail markets and examined for the presence of members of the coli-aerogenes group of bacteria.

2. Typical *Escherichia coli* were found on 16 of the fillets, and on 2 of the eviscerated fish.

3. Lactose-fermenting organisms other than *Escherichia coli* were commonly encountered on both fillets and eviscerated fish. Because of this fact, gas production from lactose broth tubes taken alone is not sufficient evidence of contamination. Differential tests should be made to determine whether or not the responsible organism is *Escherichia coli*.

4. Further investigation is recommended to study the possibility of using the occurrence of *Escherichia coli* as an index of the sanitary quality of marine fish and fillets.

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Can the Health Officer Safely Utilize Prophylactic Immunization as the Sole Means to Control Canine Rabies?*

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THE answer to the question "Can the health officer safely utilize prophylactic immunization as the sole means to control canine rabies?" is definitely in the negative.

In controlling outbreaks of rabies it is essential that the cycle by which the disease is propagated from one susceptible animal to another be broken, so that the disease ceases when the last infected animal succumbs.

The successful use of a prophylactic vaccine as a sole means of controlling rabies would be predicated upon the assumption (1) that the vaccine is 100 per cent effective, and (2) that every dog is treated with such a vaccine.

So far as I am aware no biological product has yet been developed that is 100 per cent effective, rabies vaccines being no exception, and the ever-present stray dog precludes the possibility of treating the entire dog population.

Since it is apparent that the use of vaccines alone cannot be depended upon to control the disease, it seems desirable to discuss the part that vaccination may play in the control of outbreaks of rabies.

Such methods as licensing dogs in general, quarantine measures, and the impounding and disposal of stray dogs, have been used for years, and the success of these measures has been proportional to the vigor with which they have been prosecuted. In some countries, notably England, these methods have resulted in complete eradication of the disease.

Following the work of the Japanese investigators, Umeno and Doi,[1] the prophylactic, single injection method of vaccination of dogs was introduced into the United States as an added weapon in the control of rabies. That it has had extensive use is indicated by the records of the Division of Virus-Serum Control, of the U. S. Bureau of Animal Industry, which has jurisdiction over biological houses operating under federal veterinary license. From January, 1923, to January, 1934, approximately 3,700,000 doses of this type of vaccine were prepared by such commercial houses.

The use of prophylactic vaccination in conjunction with other measures in controlling rabies is predicated on the reduction of the susceptibility of dogs in that area to the disease, and the extent to which vaccination will be an aid depends on the efficacy of the vaccines and their proper administration. Since the proper administration of the vaccine is a technical procedure, this should be

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* Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 10, 1935.

left in the hands of the veterinarian. To be of value, vaccination need not be 100 per cent, but it should be reasonably effective; it should be a safe procedure; and, lastly, the limitations of the method should be recognized.

The U. S. Bureau of Animal Industry has made experimental investigations of the efficacy of the prophylactic single injection canine rabies vaccines and at various times has published the results. In the first publication [2] 5 separate experiments were made, in some of which the results were favorable, and in others unfavorable. Those familiar with animal experimental work, particularly with rabies, are cognizant of the difficulties of this type of experimentation and of the varied results that may occur. In rabies work, the type of material used to expose animals, the method used, and variations in individual animals are factors which have a bearing on the results and at times are difficult to control.

It was found that while the fixed virus entering into the vaccine was attenuated, it was capable, under certain circumstances, of inducing the fixed virus disease, a feature quite objectionable in a prophylactic vaccine. Biological houses were required to change their methods of production so that the virus entering into the vaccine was killed. This is the type of vaccine that is now, and for some years has been, in use commercially in this country. The bureau's experimental work on this type of vaccine was reported in later papers.[3, 4] These experiments, while limited, indicated that resistance to rabies could be increased in many dogs by a single injection of vaccine. However, this resistance is only relative—in some animals it may be strong, in others weak, or lacking, so that some may be able to withstand actual exposure to the disease whereas others may not. The duration of immunity also probably varies. Experimental information indicates that appreciable immunity in some dogs may persist for at least a year. Immunity should not be expected to last longer.

Observations from the field use of the vaccine indicate that vaccination has been of value in the hands of many veterinarians. However, failures of the vaccines to protect have also been reported. These observations are in accord with our experimental work. The amount of exposure that an animal receives and the individual variations are no doubt factors that have a bearing on the effectiveness of vaccination.

It is important, therefore, to recognize that while the resistance to rabies of many vaccinated dogs may be raised, failures to protect can and do occur, and no false sense of security should prevail because of such vaccination.

Reports from the field indicate that many thousands of dogs have been vaccinated with no untoward effect from the vaccine itself. Occasional reports indicate that unfavorable reactions occur from the injection. These have been indicated by paralysis, for the most part transitory, although a few cases have had a fatal termination. No generally satisfactory explanation as to the cause of these adverse reactions has been advanced. The commercial vaccines in use in this country are killed by phenol or chloroform. Federal regulations require that the vaccines be injected subdurally into rabbits (the most rigid test available) as a test for viability of the virus before these are marketed. If the vaccines are properly prepared, they should contain no viable virus capable of producing the disease. When unfavorable reactions occur in dogs, it appears that these occur with certain lots of vaccine, and while we have examined such lots of vaccine, we have been unable to demonstrate the presence of living virus as a responsible factor. The idea has been put forth, however, that in some part of certain vaccines, viable virus may be present in larger portions

of brain tissue which may have escaped the action of the killing agent, and when injected into a particularly susceptible dog may result in a fixed virus infection. Other explanations have been suggested, viz., a rabies toxin, toxic material contained in the brain tissue entering into the vaccine, etc.

While field evidence on the use of vaccine indicates that untoward reactions occur infrequently, the fact that they can and do occur should be recognized. Much of the opposition by dog owners to vaccination is based on fear of these reactions. Dog owners are entitled to a frank appraisal of the vaccines. There is no doubt that vaccination has been unjustly accused of causing trouble in many cases in which it was in no way responsible.

Since vaccination may be a possible hazard to the dog, even though this may be quite remote, it would appear that the general use of vaccine should be restricted to actual or potential outbreaks of the disease.

Since there is a possibility of a negative phase following vaccination, it seems desirable to confine treated dogs for 2 to 3 weeks following vaccination.

It is desired to emphasize again that vaccination, no matter how effective, cannot in itself control rabies. The vigor with which such other control measures as licensing and quarantine, and the impounding and disposal of stray dogs are carried out will determine to a large extent the duration of outbreaks in communities.

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Tuberculosis in Dairy Cattle

THE U. S. Department of Agriculture has reported an outbreak of tuberculosis in a herd of dairy cattle located at the Federal Experiment Station at Beltsville, Md. This herd which is used for experimental purposes has been accredited for tuberculosis freedom for 18 years and has been maintained almost entirely by replacements raised on the farm. In the last previous test in October, one reactor to tuberculin appeared. On January 16, 82 reactors and 11 suspect reactors were revealed.

In accordance with the policy of the Department of Agriculture, these affected animals are being slaughtered and subjected to post-mortem examinations. The sudden appearance of the disease and the rapid spread were very unusual and no explanation could be found for the extensive outbreak. A study is being made to determine whether a virulent strain of the bovine organism gained access to the herd or whether, possibly, sabotage was responsible.

The situation illustrates a condition which may face health departments which have depended upon examinations for freedom from tuberculosis in dairy herds carried out at intervals much longer than those indicated in this outbreak.

Encephalitis of the St. Louis Type in Illinois*

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THE occurrence of an outbreak of 1,097 cases of encephalitis in St. Louis during the summer and autumn of 1933 came as a surprise to the medical profession and public health officials in this country. A complete record of the St. Louis outbreak has been published by the U. S. Public Health Service.[1] The general apprehension felt at that time was particularly acute in Illinois because of the close proximity of the outbreak. Accordingly, the attention of the Illinois Department of Public Health became focused upon the St. Louis area for the purpose of controlling the possible spread of the disease in this state.

The character of the St. Louis outbreak reminded Illinois public health officials of a similar one in Paris, Edgar County, Ill., in August, 1932. At that time there were 38 cases which were diagnosed as epidemic encephalitis by the attending physicians and representatives of the Illinois Department of Public Health. An epidemiological report was published by Houston [2] in December, 1932. The source of the illness could not be determined. Food and water supplies appeared to have no relation to the outbreak. None of the patients had been away from home, and no deviation from routine living habits of these persons had taken place. In 2 instances, relatives who had nursed patients became ill with encephalitis 15 and 6 days respectively after exposure. As 14 of the 38 patients died, there was a fatality rate of 37 per cent. No bacteriological or pathological studies were conducted. A survey of the recovered patients in May, 1935, revealed no sequelae attributable to their illness in 1932.

In the studies of the St. Louis outbreak of 1933, several strains of filtrable virus were isolated from brains of fatal cases by Muckenfuss, Armstrong, and McCordock,[3] and by Webster and Fite [4] by intracerebral inoculation of laboratory animals. This virus will be referred to as the St. Louis virus. Webster and Fite [4] found that blood from several of the recovered St. Louis patients contained specific protective properties against this virus when injected into mice. Shortly after, Webster and Fite [5] reported that 5 specimens of blood from persons who recovered from encephalitis in Paris, Ill., in 1932, also contained specific protective properties against the St. Louis virus.

Wooley and Armstrong [6] reported that blood specimens from 10 of 12 persons who recovered from this disease in Paris in 1932 contained specific protective properties against the St. Louis virus. These studies proved that the outbreak at Paris was caused by the same infecting agent as that at St. Louis. Blood collected by the writer in February, 1935, from 10 of the recovered patients in the 1932

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* Read before the Epidemiology Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

TABLE I

ENCEPHALITIS OF THE ST. LOUIS TYPE IN EDGAR COUNTY DURING THE SUMMER AND AUTUMN OF 1932

Age Groups	*Cases*	*Deaths*	*Morbidity Rate (per 100,000)**	*Mortality Rate (per 100,000)**	*Case Fatality Per Cent*
0–14	0	0	0	0	0
15–24	2	0	48	0	0
25–34	5	0	60	0	0
35–44	0	0	0	0	0
45–54	6	1	203	34	17
55–64	9	4	390	174	44
65–74	9	5	589	327	56
75 and Over.	7	4	1,113	636	57
All Ages	38	14	152	56	37

* Calculated on population as of the fifteenth census of the United States: 1930.

TABLE II

ENCEPHALITIS OF THE ST. LOUIS TYPE IN ILLINOIS DURING THE SUMMER AND AUTUMN OF 1933

County	*Cases*	*Deaths*	*Morbidity Rate (per 100,000)**	*Mortality Rate (per 100,000)**	*Case Fatality Per Cent*
La Salle	7	3	7	3	43
Macon	7	2	9	3	29
Macoupin	10	4	21	8	40
Madison	24	7	17	5	29
Morgan	16	7	47	20	43
St. Clair	18	5	12	3	28
Entire State	177	62	2.3	0.81	35

* Calculated on population as of the fifteenth census of the United States: 1930.

outbreak in Paris, were submitted to the National Institute of Health* and the Rockefeller Institute for Medical Research* for conducting additional protection tests. It was found that blood from 7 of the 10 still contained protective properties against the St. Louis virus 30 months after the epidemic. As a result of all protection tests on blood specimens from the Paris outbreak of 1932, it was found that 13 of the 21 recovered patients had developed specific protective porperties against the St. Louis virus.

* Results of the studies on blood specimens from Illinois were reported in personal communications to Dr. Frank J. Jirka, Director of the Illinois Department of Public Health. We wish to express the appreciation of the Illinois Department of Public Health to Drs. G. W. McCoy, J. P. Leake, and Charles Armstrong, of the National Institute of Health, and to Dr. Leslie T. Webster of the Rockefeller Institute for Medical Research for their coöperation in these studies.

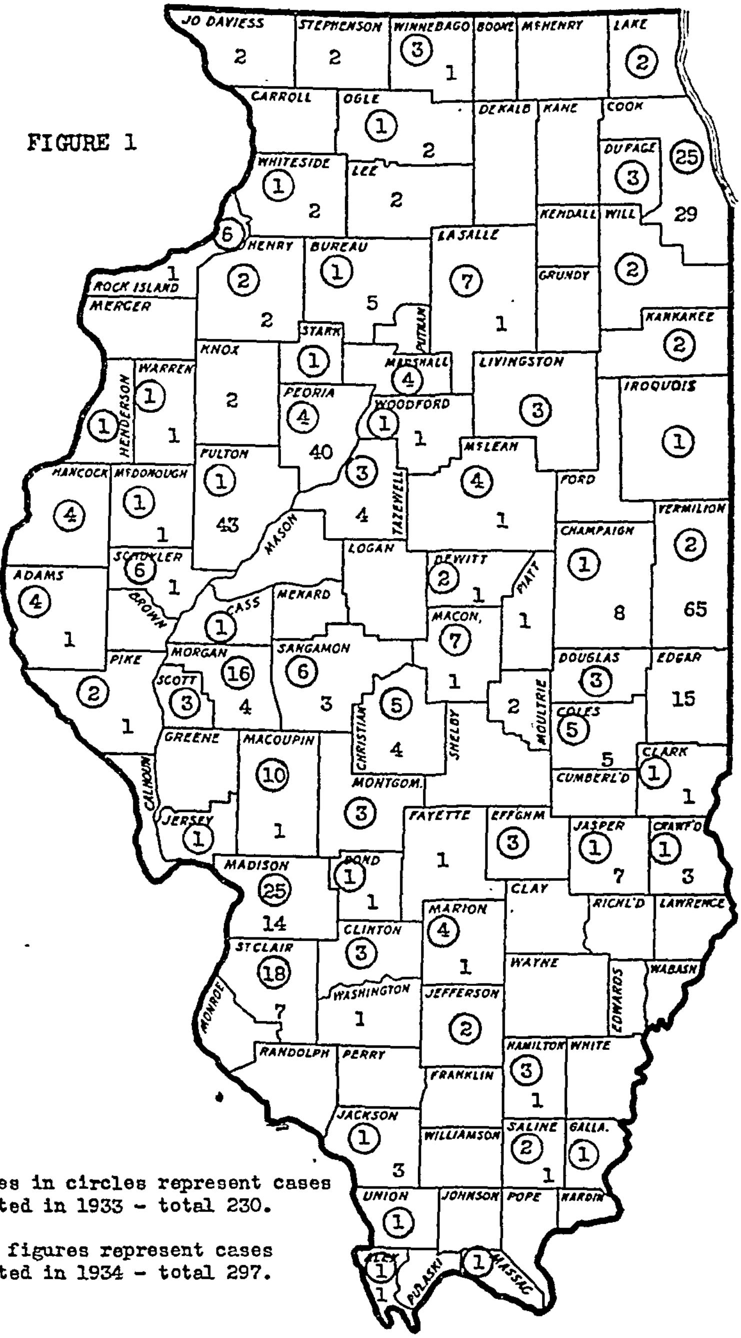
More cases of encephalitis occurred in Edgar County in 1932 than in any other county in the state (Table I). This small community had a morbidity rate of 152 per 100,000 population as compared to 100 in the outbreak in St. Louis in 1933. As in St. Louis, the largest number of fatalities occurred in persons in the upper age groups.

During the outbreak in St. Louis in 1933, 177 cases of the disease were recognized in Illinois, most of which occurred in Madison and St. Clair Counties, which are nearest St. Louis (Figure I).† No cases of this type of encephalitis occurred in Edgar County during 1933. The fatality rate, 35 per cent (Table II), was almost twice that of St. Louis,

† An analysis of the symptoms and physical findings in the outbreaks of 1933 and 1934 in Illinois has already been published.[7]

CASES OF ENCEPHALITIS (ALL TYPES) IN ILLINOIS
REPORTED BY COUNTIES 1933 AND 1934

FIGURE 1



Figures in circles represent cases reported in 1933 - total 230.

Plain figures represent cases reported in 1934 - total 297.

20 per cent, during the corresponding period. The writer collected no specimens for the detection of protective properties in the blood of patients who recovered from encephalitis in Illinois during 1933.

As in the summer of 1933, there was a severe drought in Illinois in the summer of 1934. Early in August, the number of cases of encephalitis increased very rapidly, the peak being reached on September 1, following which there was a gradual decline during September and October. In contrast to 1933, when most of the cases of encephalitis occurred in counties near St. Louis, the largest numbers of cases in 1934 (Figure I) occurred in counties remote from the St. Louis area. During August, September, and October, 1934 (Table III), 234 cases of encephalitis occurred throughout the state with a fatality rate of 22 per cent, about the same as that in the St. Louis outbreak during 1933. It is of interest to note that Chicago escaped this type of encephalitis during the past 3 years, when it was prevalent in other sections of the state.

Edgar County was one of those reporting a large number of cases during 1934. The illness was not confined to persons in the upper age groups as in 1932 (Table IV). Most of the patients were residents of Paris. Of the blood specimens taken in February, 1935, from 9 of the 13 recovered patients, 5 were shown to contain protective prop-

TABLE III

ENCEPHALITIS OF THE ST. LOUIS TYPE IN ILLINOIS DURING THE SUMMER AND AUTUMN OF 1934

County	*Cases*	*Deaths*	*Morbidity Rate (per 100,000)**	*Mortality Rate (per 100,000)**	*Case Fatality Per Cent*
Champaign	8	1	12	2	13
Edgar	16	3	64	12	19
Fulton	43	14	98	32	33
Jasper	7	0	55	0	0
Madison	14	6	10	4	43
Peoria	40	6	28	4	15
St. Clair	7	3	4	1	29
Vermilion	65	9	73	11	14
Entire State	234	51	3	0.66	22

* Calculated on population as of the fifteenth census of the United States: 1930.

TABLE IV

ENCEPHALITIS OF THE ST. LOUIS TYPE IN EDGAR COUNTY DURING THE SUMMER AND AUTUMN OF 1934

Age Groups	*Cases*	*Deaths*	*Morbidity Rate (per 100,000)**	*Mortality Rate (per 100,000)**	*Case Fatality Per Cent*
0–14	2	0	29	0	0
15–24	2	0	48	0	0
25–34	1	0	30	0	0
35–44	2	0	64	0	0
45–54	1	1	34	34	100
55–64	3	0	130	0	0
65–74	2	1	131	65	50
75 and Over	3	1	477	159	33
All Ages	16	3	64	12	19

* Calculated on population as of the fifteenth census of the United States: 1930.

TABLE V

CASES OF ENCEPHALITIS (ALL TYPES) IN ILLINOIS
REPORTED BY MONTHS 1925–1935

Year	*Jan.*	*Feb.*	*March*	*April*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Total*
1925	15	13	12	10	5	6	7	8	10	5	6	15	112
1926	8	8	5	9	8	11	7	10	17	12	6	8	109
1927	9	11	8	16	14	7	9	9	7	3	9	10	112
1928	3	6	11	7	9	11	11	3	8	4	7	11	91
1929	8	7	14	6	15	1	5	12	3	2	5	2	80
1930	6	7	6	13	6	5	5	2	4	15	2	6	77
1931	4	6	5	5	5	5	7	0	13	5	1	7	63
1932	1	11	10	6	4	7	3	28	16	6	8	11	111
1933	6	2	5	8	2	5	4	24	95	58	12	9	230
1934	7	5	6	3	3	5	7	89	112	33	13	14	297
1935 *	18	6	10	18	11	8	7	10	13	11	8	3	123

* Complete figures for 1935 are included for purposes of comparison.

erties. Of particular interest is the fact that 1 of these persons was the 15 year old son of one of the recovered patients from the 1932 outbreak. Blood from both father and son contained protective properties. Thus, it was found that blood from 18 of 26 recovered patients from the 1932 and 1934 outbreaks in Paris showed specific protective properties against the St. Louis virus.

Of specimens of blood taken in October, 1934, from 21 of the recovered patients in Vermilion County who had had encephalitis during the preceding 2 months, 13 were found to contain protective properties against the 1933 St. Louis virus. Similarly, of blood specimens from 6 patients in Fulton County, 3 were found to contain protective properties. However, specimens of blood from 19 recovered patients in Peoria County failed to show protective properties against the St. Louis virus. These findings are interesting, in view of the fact that the disease in Peoria County was the same clinically as in other sections of the state. One is led to speculate upon the possibility of an unrelated virus which causes a similar disease, particularly in view of the studies of Armstrong and Wooley [8] on a second virus isolated from the brain of a patient who died in St. Louis in 1933, which caused lymphocytic choriomeningitis in mice. These investigators [8] found that the blood of a patient in Vermilion County who recovered from encephalitis in 1934, showed strong protective properties against the virus of choriomeningitis, in addition to protective properties against the St. Louis virus (Freeman strain).

Table V shows the number of cases of encephalitis of all types* reported to the Illinois Department of Public Health during the past 11 years. The increase in the number of cases during August, September, and October during 1932, 1933, and 1934 is worthy of note. The increase during the early months of 1935 is due to cases of post-infectious encephalitis following chicken pox, measles, and mumps, and not to primary encephalitis. With the appearance of mild weather in June, post-infectious encephalitis decreased. During the

* In *Monograph Number 214*, the U. S. Public Health Service classifies encephalitis as follows:

1. Infectious encephalitis:
   1. Type A, or Economo or lethargic type, chiefly sporadic
   2. Type B, chiefly epidemic
      (a) Japanese form
      (b) St. Louis form
   3. Other types, possibly the Australian
2. Post or para-infectious encephalitis, chiefly seen following measles, smallpox, vaccinia, or chicken pox

summer and autumn months of 1935 there was no increase in Type B encephalitis comparable to that of the preceding 3 years. Most of the reported cases during the summer of 1935 were Type A, or the Economo type.

SUMMARY

1. Outbreaks of encephalitis of the St. Louis type occurred in Paris, Edgar County, Ill., during 1932 and 1934 with a fatality rate of 31 per cent. Of 26 blood specimens from recovered patients, 18, or 70 per cent, were found by investigators in the National Institute of Health and the Rockefeller Institute for Medical Research to contain protective properties against the St. Louis virus.

2. During the course of the outbreak of encephalitis in St. Louis in 1933, 177 cases were reported in Illinois, with a fatality rate of 35 per cent.

3. During the summer and autumn of 1934, 234 cases of primary encephalitis were reported in Illinois, with a fatality rate of 22 per cent. Vermilion, Fulton, and Peoria Counties reported the largest numbers of cases.

4. Of 21 blood specimens from recovered patients in Vermilion County in 1934, 13, or 64 per cent, contained protective properties against the St. Louis virus.

5. Of 6 blood specimens from recovered patients in Fulton County in 1934, 3, or 50 per cent, contained protective properties against the St. Louis virus.

6. Blood specimens taken from 19 recovered patients in Peoria County in 1934 failed to show protective properties against the St. Louis virus. In view of the similarity of the clinical symptoms of these persons with those suffering from primary encephalitis in other sections of the state, the possibility that the illness was caused by an entirely unrelated virus should be considered.

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Too Many Claims Spoil the Medicine Man's Game

ALTHOUGH not nearly so common as they used to be, there are still occasional quack medicine vendors who stick to the old and illegal labels that claim for their nostrums curative powers over at least a good part of the ills and ailments that affect mankind.

Recently, for example, drug inspectors picked up samples of what were labeled "Devonshire's Earth Salts," marketed by F. S. Powers & Co., Crystal Lake, Ill. These were offered as a treatment for the following assortment of diseases and conditions: Pneumonia, cancer, diphtheria, typhoid fever, kidney and bowel trouble, appendicitis, intestinal worms and tape worms, locomotor ataxia, nervous disease, rheumatism, stomach trouble, skin diseases, malaria, high blood pressure, boils, abscesses, goiter, tumors, stomach ulcers, chills, colds, bronchitis, snake bites, delirium tremens, diabetes, venereal diseases, heart trouble, sterility in men and women, and also for "other disease conditions."

The nostrum got into interstate commerce and that brought it under the Federal Food and Drugs Act which penalizes sweeping claims not founded on fact and contrary to medical experience. A Federal court fined the seller.—U. S. Dept. of Agriculture *Release*, Feb. 16, 1936.

Dust Determinations*

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RESEARCH and experience have shown that concentration, composition, and particle size distribution are the main factors to be considered in determining if any particular dust will cause pneumoconiosis. The length of exposure to a harmful dust is a very important factor in actually producing the pneumoconiosis.

CONCENTRATION

In the United States the standard method of determining the concentration of a dust for industrial hygiene work is by use of the Greenburg-Smith impinger sampling instrument and the standard microscopic technic as described by U. S. Public Health Service.[1]

Many variations of this standard technic, such as using higher magnification for counting, darkfield illumination,[2] different sampling liquids, etc., have been employed in making dust counts—all with the purpose of obtaining a more accurate measure of the dust concentration to explain the harmfulness or non-harmfulness of certain dusty conditions.

After making several studies of dust conditions in industrial plants, it was believed that there should be a much simpler, faster, and more accurate method of determining the number concentration of dusts; a method which would eliminate many of the undesirable features of impinger determinations. Some of the objections which have been brought against the impinger method are:

1. The time required for obtaining results is long.
2. The dust is entrained in a liquid medium, where some particles may be soluble, and particles may coagulate or stick to the container.
3. Particles less than 0.7 to 0.8 microns are not counted.
4. Particle size determinations are not readily obtainable.
5. All aggregates of particles which may exist in the air are broken up.
6. Solid particles are sometimes fractured when they strike the impinger plate.
7. The efficiency, although high, is not 100 per cent and apparently decreases with particle size.

A consideration of other methods of sampling and counting showed that they all had many disadvantages and limitations. Probably any method which can be devised will have at least some of these objectionable features.

The thermal precipitator as developed by Professor Whytlaw-Gray and Dr. Lomax, and further improved and described by Green and Watson,[3] appears to have overcome many disadvantages of other methods. In this sampler the dusty air is drawn through a narrow rectangular channel 0.051 x 1.0 cm. at 6.5 c.c. per minute. The dust is deposited thermally, from a hot wire across the center of this channel to two cover slips which are held along the sides of the channel. The dust is

* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

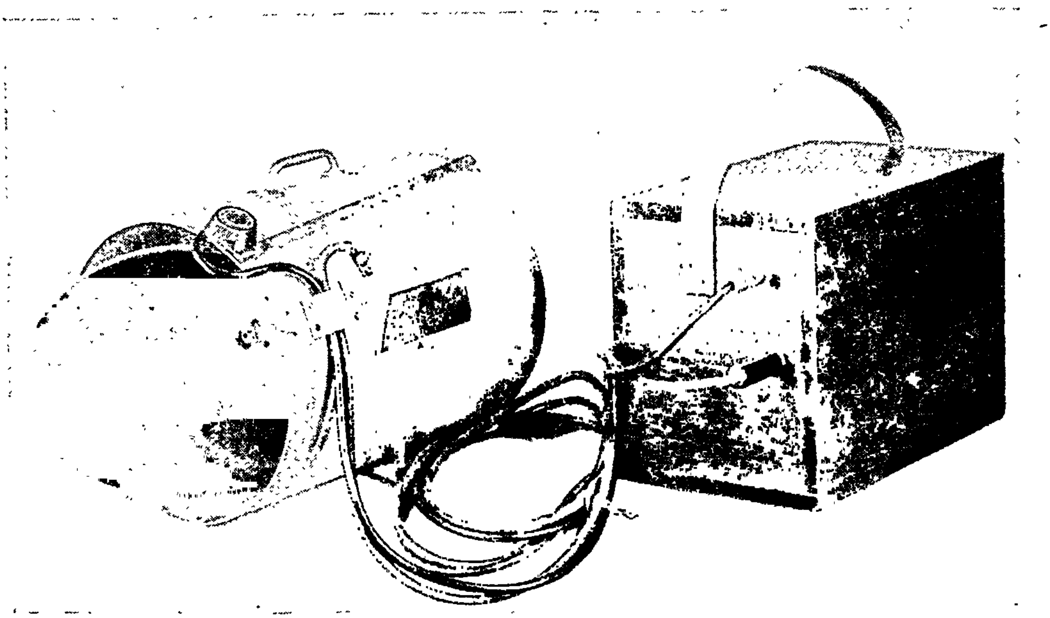

FIGURE I—Sampling Instrument and Power Supply

thus deposited in a narrow strip across two cover slips, giving a record similar to that of the Owens Jet Dust Counter. Its efficiency is claimed to be practically 100 per cent and the sample is obtained in a desirable condition.

Working in conjunction with Mr. Penney of our Research Department we have developed an Electrostatic Dust Count Sampler which I feel gives a desirable type of sample, the efficiency of the sampler being practically 100 per cent. A detailed description of this sampler will be given in the *Journal of Industrial Hygiene*, and only a brief description of it is given here.

A sample of the dusty air is trapped in a cylinder and deposited electrostatically over its inside surface. A microscope slide placed in one side of the cylinder receives its proportionate share of the total dust, the dust particles being, in general, uniformly distributed over the slide. This slide can then be removed, covered with a rectangular cover slip and examined microscopically.

The sampling instrument and its power supply are shown in Figure I. The sampling chamber consists of an aluminum cylinder 9″ in diameter and 12″ long, the ends of which are covered by disks of micarta. These ends, which support a fine ionizing wire axially through the center of the cylinder, can be opened and closed by the knob near the top of the cylinder. The slide holder as shown in Figure II holds a 25 x 75 mm. microscope slide under the two screws, the upper half being hinged to cover the slide. This holder fits into the opening in the side of the sampling chamber with the slide facing inward.

The sample is trapped by opening the ends, moving the cylinder to the exact sampling location, and closing the ends. Then the slide holder is opened and the dust deposited, this requiring about 15 seconds. A special microscope slide is used, as it must have a conducting surface over it to prevent distortion of the electrostatic field in the cylinder. These slides are prepared by a glass laboratory and are transparent and conducting, and the glaze is permanent. They cannot be used for darkfield illumination as obtained at present due to sub-microscopic particles in this

coating but they are entirely satisfactory for any lightfield determinations. This is not considered a serious disadvantage as many data indicate there are only a small percentage of particles less than 0.2 microns in industrial dusts. It is hoped that the slides can soon be obtained with a satisfactory surface for darkfield illumination so that the necessary research work on the finer particles can be carried out. Some research being carried on at present indicates that it may be possible to construct a sampler of this type which will use a regular microscope slide.

An advantage of this sampler is that an instantaneous sample can be taken when so desired. However, this is also a disadvantage since it cannot take a continuous sample. This objection is partially overcome since it takes a sample of about ½ cu. ft. at a time, and several samples can be taken on the same slide at intervals of about 15 seconds for short time variations; or several minutes for longer time variations.

These two samplers, the thermal and electrostatic, offer many advantages for sampling industrial dusts. It is sincerely hoped that after some experimental work one or the other can be adopted for general dust counting work.

COMPOSITION

The determination of the composition of a dust is of utmost importance since it has been shown that only certain dusts produce pathological changes in the lung tissues. Apparently the mineralogical composition of many dusts is the factor of most importance.

The mineralogical composition of the larger dust particles or of pieces of the original mineral can in general be made with the petrographic microscope, but for most dusts the greater percentage of the particles is below this limit and cannot be determined in this way. There are a very few minerals which

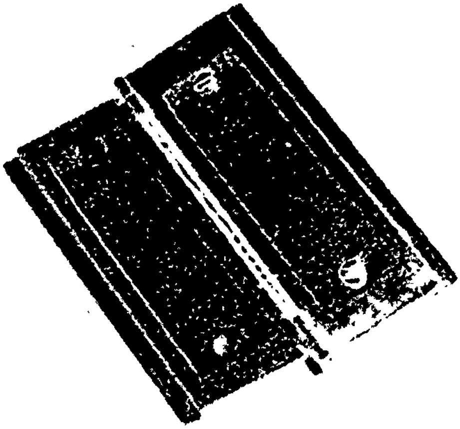

FIGURE II—Slide Holder

can be identified in the smaller particle sizes by a consideration of shape and certain optical properties.

The chemical composition of the dust can be accurately determined, and often a close approximation to the percentage of mineral constituents can be estimated from a complete chemical analysis of the sample and consideration of the chemical composition of the original materials.

For chemical analysis, the actual air-borne dust should be used, but it has been difficult to obtain a sample sufficient in quantity, but recent research has made it possible to build a small electrostatic air cleaner which can be used for this purpose. This will remove practically all of the dust from air which is drawn through by a small fan at the rate of 125 cu. ft. per minute. Its efficiency against fine particle smokes is 99.5 per cent by weight.

The cleaner consists of an ionizing chamber at the top and a group of parallel plates where the dust is deposited. The dust can then be brushed from the plates and used for chemical or other analyses. I will not give a theoretical discussion of the operation of this cleaner as it has not yet been published by our Research Department.

The complete sampler is shown in Figure III. It is 26″ high and 10″ x 16″ at the base, its weight about 50 lb. The air is drawn in at the top and downward through the sampling chamber by a small fan at the bottom of the cabinet. The ozone generated by the sampler is less than 1 part in 10 million. The power supply, which is located in the compartment at the rear, consists of a transformer, 2 rectifier tubes, and a condenser. It supplies 12,000 volt DC to the ionizing chamber and 4,500 volt to the plate assembly. The entire sampler is operated from any 110 volt, 60 cycle supply.

With this sampler it is possible to obtain a gram or more of dust in several hours in most dusty places. This sample can be used for accurate chemical analysis and for many other desirable determinations.

PARTICLE SIZE

Due to the research work of Gardner and associates [4] of Saranac Lake, it has been shown that in general the smaller sized particles are more active in producing fibrotic changes in the tissues where the dust lodges. This indicates that a very fine dust would be more harmful than a similar dust of large particle size.

Independent investigators have found that the particle size distribution of most industrially generated dusts is approximately the same. However, different investigators give widely different values for this. In general, this average particle size is from 0.6 to 1.5 microns.[3, 5, 6, 7]

No doubt some of these differences are due to different sampling methods and different microscopic technic; however, the microscopic magnification has been similar in most cases, and the minimum visible particle sizes should be similar.

The Owens Jet Dust Counter was used as the sampling instrument in most cases, and although its efficiency is questionable, the results should be comparable.

These indicate that the average particle size of different industrial dusts is quite different, and further show that a standardization on the best method would increase the value of the results many times.

The measurement of particle size by use of the filar micrometer is tedious and difficult for the smaller particles. The method of using a comparator graticule [6] in the eyepiece of the microscope is much easier. However, a method of micro-projection has been developed by Brown and Yant at the Bureau of Mines and is described in detail by them.[8] This is apparently the simplest, quickest, and most accurate of the various methods.

FIGURE III—The Complete Sampler

SUMMARY

A brief discussion of the standard dust counting method is given and several of the disadvantages enumerated. A consideration of the thermal precipitator and an electrostatic dust count sampler shows that at least some of the disadvantages have been overcome in these samplers, and this suggests that they are probably more desirable methods for dust counting. In determining the composition of an airborne dust it has been difficult to obtain a sample sufficient in quantity for chemical analysis, but a sampler has been developed for this purpose and it is described.

Particle size distribution of a dust is important, and data are given to show that the particle size distribution of dusts as determined by different investigators show marked variations. The best method of sampling and determination should be adopted as a standard. The method of microprojection seems to be the simplest, quickest, and most accurate.

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DISCUSSION

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In presenting his electrostatic dust sampling instrument and recommending its use, Mr. Barnes has premised its advantages on presumed faults of the impinger apparatus. The criteria which should be used in the selection of a dust sampling instrument for industrial hygiene studies are the collecting efficiency of the device, its ability to obtain large samples in a relatively brief period of time, its portability, its small errors in analysis, and, finally, the ease with which a sample once obtained may be analyzed. Mr. Barnes has listed 7 objections which have been brought against the impinger apparatus and the present method of analysis of impinger samples as conducted by the Public Health Service. Let us examine these objections in the light of the above criteria, and apply these same criteria to the instrument and method of analysis developed by Mr. Barnes, and described by him in the present paper.

The instrument described by Mr. Barnes is capable of taking an instantaneous sample of ½ cu. ft. volume. Mr. Barnes realizes the disadvantages of not being able to collect a continuous sample, and states that this objection is partially overcome by taking several samples on the same slide. Such a practice is apt to lead to erroneous results, due to the fact that the subsequent dust particles may be

deposited on those already collected on the slide, thereby yielding lower results. Such has been the experience with certain types of impingement devices in which the dust is deposited on a glass slide. If several slides are used, then the method becomes complicated.

Mr. Barnes's second objection is that the dust is entrained in a liquid medium where some particles may be soluble and others may coagulate. The Public Health Service recommends that samples obtained with the impinger be analyzed as soon as possible, usually within 24 hours of collection. It is felt that most mineral dusts of hygienic significance are not sufficiently soluble in such time to result in a significant loss of the sample. In our 12 years' experience with this instrument, we have had very little trouble with coagulation or flocculation.

The third objection is that it is not possible to count dust particles less than 0.7 to 0.8 μ in size. It is true that the microscopic technic used by us fails, in dealing with highly refractile dusts, to reveal particles less than 0.7 μ, but our work has shown that the number of such particles present in industrial atmospheres is comparatively small. Particle size studies conducted by us have shown that about 25 per cent of the suspended dust in the air is less than 0.7 μ. Moreover, it has as yet not been definitely established that these small size particles are of more pathological significance than those say from 0.7 to 3 μ. For these reasons, it is felt that our present technic reveals the significant size dust particles in the air of industrial establishments.

The fourth objection is that particle size determinations are not readily obtainable from impinger samples. Although in all such studies by us we have resorted to the Owens jet dust counter for particle size measurements, we have also had very little difficulty in preparing specimens for such measurements from dust collected by the impinger. This technic is described in *Public Health Bulletin No. 217.*

The statement that aggregates of particles which may exist in the air are broken and that solid particles are sometimes fractured when they strike the impinger plate, is not supported by proof.

The last objection, that the efficiency although high is not 100 per cent, cannot be considered seriously in view of the fact that independent research workers have shown that the impinger apparatus collects industrial dusts with an efficiency of 98 per cent plus.

It is apparent, therefore, that when judged in the light of the criteria suggested, the impinger apparatus is shown to be an excellent instrument for the purpose intended, namely, the evaluation of the dust hazard. Many years of use of this instrument, not only by us but by workers elsewhere, have shown it to be a device which can be employed for sampling in both high and low dust concentrations, with high efficiency, and the method of enumeration employed at present has been shown to be practical in that excellent correlations are obtained between the impinger dust results and clinico-radiographic studies of workers exposed to the dusts under consideration.

The electrostatic air cleaner described by Mr. Barnes, and which he developed for the purpose of obtaining large quantities of atmospheric dust for chemical analysis, will no doubt prove to be of value in certain types of investigations. However, as Mr. Barnes himself points out, in pneumoconioses studies it is more important to know the mineralogical composition of the dust than its chemical composition. In view of this, samples obtained with his device will be of little value, since it is well known that the small particles in the atmosphere are not capable of identification by petrographic technic. For this

reason, we have resorted to the collection of dusts settled at the breathing level, which contain not only the smaller size particles but also the larger ones, which settle out rapidly due to their size. Another objection to the air cleaner is that it also requires electric current. This is not available in many work places, such as in mines, quarries, etc.

Mr. Barnes's discussion on particle size presents an opportunity to express the speaker's opinion that the determination of particle size as a routine procedure in dust studies has been overemphasized. The reason for the average particle size being of variable value is not primarily due to the fact of personal error as Mr. Barnes says, but chiefly to the fact that even with the same dust, different sizes are produced by varying processes. For example, in working granite, a hand pneumatic tool will produce one average size, whereas the use of a machine pneumatic tool or a hand chisel will produce another average size. In other words, these variations are due to such factors, rather than different sampling methods or different microscopic technics. On the whole our measurements of thousands of particles of different dusts produced by various industrial processes have shown that although there is some variation, most of the dust particles (60 per cent) are between 1 and 3 μ in size. We have not found the filar micrometer method for such studies to be either tedious or difficult, and comparisons with photographic technics have shown it to yield comparable results. It is our feeling that all dusts present in industrial atmospheres are of a size small enough to gain access to the lung tissue, and that the important factors in the dust problem are the concentration and composition of the dust, and the years of exposure.

Should it be found that the dust determination method used by the Public Health Service is not revealing the significant sizes of dust, we would be the first to welcome any new device which might prove to be more efficient and better adapted for such studies. It must be borne in mind, however, that the instrument should be simple in construction and operation, and that the method of evaluation should be one which has small errors and is easily conducted. Mr. Barnes's electrostatic precipitator may have a slightly higher sampling efficiency than the impinger, but he has still to work out a method of enumeration which can be considered more practical than the present technic. In the final analysis, the method of dust sampling and counting which yields a practical index of the dustiness of an atmosphere is the one to employ. The instrument and method used by us over a period of many years has proved that high correlations may be obtained between dust counts in various industries and the degree of silicosis and tuberculosis among the workers exposed to the dusts investigated.

Fetal and Neonatal Mortality with Recommendations for Reduction*

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THE time from birth to 2 weeks is a unique epoch in the life of the individual. It is known as the neonatal period and during these days complete adjustment must be made from a sheltered intrauterine existence to one subject to the rigors of the external world. The causes of death in this period are largely distinct from those occurring later in life, but are closely allied with those operating as a cause of death before and during birth. For a complete understanding of the factors causing infantile deaths, study of antepartum and intrapartum deaths must be included.

At the Chicago Lying-in Hospital in Chicago there were 267 autopsies performed after deaths occurring in the first 10,000 consecutive deliveries, constituting 60 per cent of the deaths, and 61 per cent of the stillbirths. There were a total of 243 stillbirths after the 5th month of gestation and 198 deaths in the neonatal period, 75 per cent of which occurred inside of 24 hours, making a rate of 2.49 stillbirths per 100 live births and 23.9 neonatal deaths per 1,000 live births.

The most important causes of stillbirths are: asphyxia (38 per cent), due in large measure to placental and cord abnormalities and evidenced at autopsy by numerous petechial hemorrhages on the serous surfaces of the heart, lungs, thymus, liver, kidneys, or adrenals, together with marked engorgement of all peripheral vessels especially in the brain; intracranial hemorrhage (15 per cent), due almost invariably to birth trauma and demonstrated at autopsy by the presence of varying amounts of free blood in the intracranial cavity, either with or without falx or tentorial lacerations; major malformations (10 per cent). In only 1 case in this series could syphilis be proved the cause of death. In 22 per cent the fetus was macerated, indicating death some length of time before delivery but due to causes not determined. In 15 per cent there were no demonstrable abnormalities of any kind.

In neonatal deaths the most important factor is premature delivery of the fetus. In 32 per cent this was found as the only cause for failure to survive. Intracranial hemorrhage caused 27 per cent of the deaths, major malformations 12 per cent, asphyxia in which respiration was never established 4 per cent. In 10 per cent atelectasis of the lungs was the only

* Read before the Child Hygiene Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

pathologic lesion demonstrable and was listed as a cause of death. Although death is actually due to an insufficient gaseous exchange through the lungs the underlying cause is either depression of the respiratory center, lack of sufficient vitality to institute vigorous respiration or, more infrequently, inability to eject inspired amniotic fluid from the alveoli. Syphilis was proved in only 1 case, or less than 1 per cent.

By investigating the causes of death and by examining the summary in which they are listed according to the periods in which they operate, it may be seen that any effort to reduce neonatal mortality cannot be separated from the attempt to lessen the number of deaths in the ante- and intra-partum periods. The earlier in pregnancy death occurs, the less is known regarding the etiology and consequently the more difficult the problem of prevention. Abnormal development or faulty implantation of the ovum, abnormalities of the uterine mucosa, disturbance of ovarian or other endocrine function are the conditions usually surmised, but difficult to prove except in rare instances.

Later in pregnancy placental abnormalities are an important cause of death but impossible to prevent except in so far as in rare instances the child can be delivered by operative procedures when distress becomes apparent. Deaths from major malformations are inevitable and will always occur. They are due in large measure to abnormal germ cells and although various intrauterine conditions have been postulated as contributing factors none have been proved.

Of the known causes of death in the antepartum period those in which there is most hope of effecting a reduction are syphilis and the diseases specifically associated with pregnancy. Syphilis is a much more common cause of death in some areas than in others but it is the one condition which might be eradicated completely. Every woman should have a Wassermann test early in pregnancy. If it is positive or if there is any history of insufficiently treated syphilis, antiluetic treatment should be instituted at once. It is almost impossible to cure congenital syphilis after birth, but if treatment of the mother is started early in pregnancy the infant usually is free of the disease. Deaths from the various toxemias of pregnancy, including eclampsia, can be decreased by carefully watching the patient for impending development and instituting treatment promptly if symptoms occur.

In our present state of knowledge the entire attempt to lower antenatal mortality must be directed, with the exception of treating syphilis, toward general care and observation of the mother. She should be assured a diet adequate in calories, vitamins, and minerals, given adequate rest, and protected against emotional or physical fatigue. Any known endocrine abnormality should be corrected if possible. Medical examination should be sufficiently frequent to let no untoward symptoms go unnoticed. Examination should invariably include urinalysis and blood pressure estimation, together with the study of the general state of health.

In the intrapartum period by far the most common cause of death is trauma sustained during passage through the birth canal. Prenatal care should include taking accurate pelvic measurements and late in pregnancy determination of position of the fetus. If the measurements are adequate and the presentation cephalic with the occiput anterior, a normal delivery with a minimum amount of trauma may be anticipated. If the pelvic diameters are less than normal or the position any other than that stated, more trauma is apt to occur, the degree depending on

various factors concerned. In an anterior occipital presentation the plane of the head having the least circumference advances through the birth canal. In any other position a plane having a greater circumference must pass through and more molding must occur. When adequacy of the pelvis is questionable on manual examination, Roentgen measurements should be made. If the diameters are borderline, a test of labor may be given but if no progress is made a cesarean section must be done if the child is to be saved. When the measurements are definitely below normal, the infant should be removed by cesarean section before the onset of labor. If, when the patient goes into labor, the obstetrician is uncertain of the relation between the size of the fetal head and the maternal pelvis, he is under a great handicap in outlining his course if labor does not progress normally. If the fetus is battered against structures which it cannot pass untold harm is done both to it and to the mother.

In the interior of the head running longitudinally from the frontal region to the occiput is a downward midline extension of the dura known as the falx cerebri. In its posterior portion it is continuous with the tentorium cerebelli which lies at right angles to it and covers the cerebellum. Special reinforcing fibers are present near the free margin of the falx which divide at its posterior end and extend bilaterally along the free margins of the tentorium. Increase in any diameter of the head, especially if asymmetrical, causes tension on these free margins; if the tension is sufficient the fibers may part. Rupture occurs most commonly in the tentorium near the attachment of the falx and may be unilateral or bilateral. At the same time tears permitting extravasion of blood into the cranial cavity are usually produced in the sinuses coursing through these structures. Increase in antero-posterior diameter may cause rupture and hemorrhage from the great vein of Galen which is stretched between the straight sinus in the tentorium and the circle of Willis, even in the absence of sufficient strain to cause lacerations of the falx or tentorium.

Undue stretching of the structures within the cranial cavity is the usual cause of intracranial hemorrhage and is by far the most common type of birth trauma. By referring to the summary of causes of death, we find that it occurs in many conditions—with sudden change of forces on the head, as in precipitate deliveries, in very long labors where there is excessive head molding, and in breech presentations where there is often more compression of the head than it can tolerate. The most common cause is the application of forceps to the head and in this field improvement of obstetric technic holds forth the greatest hope for diminution of injuries. Forceps should not be applied without definite indications and then only by a skilled operator.

Other less frequent injuries causing death are fracture of the cranial bones, a separation of alar and basilar parts of the occipital bone with injury to brain substance by intrusion of the lower free margin of the alar portion, fracture of vertebrae, and rupture of internal organs with ensuing hemorrhage.

Although birth injuries can never be completely eliminated as a cause of death, improvement in obstetric judgment and technic may cause a marked reduction.

In the postpartum period the most common single cause of death is prematurity. Anything which will prolong the period of gestation to normal will increase the infant's chances of survival. Here again the most important factor is adequate prenatal care, although with the best of care and the most constant supervision, labor oc-

casionally sets in prematurely without a demonstrable cause. If it is deemed advisable to terminate labor, a viable infant cannot be obtained before the end of the 28th week, and even then it is very apt to perish. If an elective cesarean section is to be performed it should be done as near term as possible.

When an infant is born prematurely it must be very carefully protected. Maintenance of temperature must be begun from the moment of birth, and to conserve its energy feeding is best carried on by gavage. Mother's milk is the only satisfactory diet and should be obtained if at all possible. All external sources of infection must be eliminated. With skill and patience it is often possible to raise surprisingly small premature infants.

Death from birth trauma occurs usually in the first few hours after birth, and is similar in its etiology and manifestations to that occurring during delivery. If an infant is born alive but shows evidence of birth trauma it is treated the same as a premature infant in an attempt to prevent increased hemorrhage.

In the postpartum period, that time immediately following delivery is the most important. To give any infant the best chance for survival the normal temperature should be maintained from the moment of birth in order to prevent an initial chilling. The respiratory passages are freed of mucus and for this purpose a soft rubber catheter may be of great value. If respiration is delayed, administration of an oxygen (95 per cent) carbon-dioxide (5 per cent) mixture, together with artificial respiration should be used if available; otherwise, resort may be had to mouth to mouth breathing. Measures formerly in vogue, such as swinging the infant by the feet, tubbing alternately in hot and cold water, are more deleterious than helpful. Reasons for delayed respiration may be depression of the respiratory center due to interference with blood supply before or during birth, intracranial hemorrhage, aspiration of amniotic fluid, narcosis of the mother, etc.

Adequate care of the infant after it leaves the birth room consists in maintaining its normal body temperature, keeping it free from contaminating influences, and insuring it sufficient assimilable food. Breast milk is the most desirable diet but if this cannot be obtained in sufficient quantities, carefully chosen complementary food is added. The mouth and skin of the infant are very susceptible to infection. Swabbing out the mouth is apt to injure the delicate tissues and usually it remains in better condition if left entirely alone. The hands of the nurse are washed before the handling of each infant to prevent any possible skin contamination from one to another. Prevention of pneumonia, contagious diseases, etc., during the neonatal period is largely the same as with older individuals and consists chiefly in keeping the infant free from any possible source of infection.

SUMMARY OF CAUSES OF FETAL AND NEONATAL DEATHS

ANTENATAL PERIOD

Placental:

1. Abruptio placenta
2. Placenta previa
3. Massive infarction
4. Insufficient size

Cord:

1. Compression
2. Obstruction due to knots, thrombi, etc.

Maternal:

1. Toxemias, including eclampsia
2. Chronic degenerative diseases, such as cardiac decompensation, glomerulo-nephritis, etc.
3. Infectious diseases, including syphilis
4. Unknown causes which may be vitamin or mineral deficiencies or endocrine imbalance
5. Physical injury

TABLE I

PRIMARY CAUSE OF DEATH AND STILLBIRTH IN 267 NECROPSIES OCCURRING IN 10,000 CONSECUTIVE DELIVERIES

Cause of Death	*Premature*	*Term*	*Stillborn*	*Total*
Previability (no abnormalities)	15	..	..	15
Prematurity (no abnormalities)	25	..	..	25
Major Malformations	7	8	15	30
Asphyxia Total	1	4	55	60
Cause Undetermined	..	4	15	..
Toxemia and Eclampsia	..	..	8	..
Abruptio Placenta	..	..	20	..
Placenta Previa	..	..	6	..
Cord Obstruction	..	..	6	..
Plug in Bronchus	1	..	..	..
Atelectasis—Cause Undetermined	1	10	..	11
Hemorrhage				
Intracranial	13	19	21	53
Visceral	1	..	1	2
Maceration—Cause Undetermined	..	..	33	33
Miscellaneous				
Peritonitis	1	1	..	2
Syphilis	1	..	1	2
Congenital Fetal Hydrops	1	1	..	2
Pneumonia	..	3	..	3
Emphysema	..	2	..	2
Endocarditis (?)	..	1	..	1
No Abnormality	..	7	19	26
	66	56	145	267

Fetal:

1. Developmental abnormalities
2. Diseases specific to the fetus, as erythroblastosis with edema, osteogenesis imperfecta, etc.

Operative termination of labor:

1. Application of forceps with too great or unequal pressure on the head
2. Version and extraction, for same reasons as in spontaneous breech deliveries.

INTRANATAL PERIOD

All conditions which produce fetal death in the antenatal period may also cause death during labor. In addition, there is the very important factor of birth trauma. Among the conditions under which it may occur are:

Spontaneous termination of labor:

1. Precipitate delivery
2. Prolonged labor due to such causes as an abnormal pelvis, disproportion between fetal head and maternal pelvis, posterior position of the head, premature rupture of membranes, etc.
3. Breech presentations in which there is too rapid head molding or too great pressure against the symphysis pubis
4. Difficult extraction of the shoulders with excessive traction or rotation of the neck
5. Rough handling of visceral portions of fetus during delivery

NEONATAL PERIOD

Inability to become adjusted to an independent existence due to:

1. Any factor operating in the antenatal and intranatal periods, either alone or in combination with those below
2. Prematurity
3. Inherent constitutional weakness
4. Abnormalities, such as cardiac defects, gastrointestinal atresia, renal aplasia, etc., which were not incompatible with intrauterine life.

Conditions not intrinsically related to the establishment of an extra-uterine existence:

1. Acute infections of skin, mucous membranes, respiratory system, gastrointestinal tract, blood stream, etc.
2. Inanition due to improper or insufficient feeding
3. Insolation and refrigeration
4. Diseases peculiar to the neonatal period,

as hemorrhagic diathesis, icterus gravis, etc.
5. Miscellaneous diseases occurring in children and adults but rarely affecting the newly-born infant.

CONCLUSIONS

Although in the last 20 years there has been a marked decrease in the death rate under 1 year, there has been a smaller decrease in the death rate for the first 2 weeks of life. There has been practically no change in the rate for stillbirths since vital statistics on this subject have been collected.

Causes of death are best divided into those operating in the antepartum, intrapartum, and postpartum periods. In the antepartum period placental abnormalities, cord compression, developmental abnormalities of the fetus, and diseases of the mother incident to pregnancy are the most common causes; in the intrapartum period trauma with resulting intracranial hemorrhage is responsible for the majority; in the postpartum or neonatal period prematurity and birth trauma are the most common causes of death.

Attempts to lower the neonatal death rate cannot be made without also attempting to lower the stillbirth rate, for deaths in both groups are frequently due to the same fundamental causes.

The main points to be stressed in attempting to prevent antenatal, intranatal, and neonatal deaths are: better prenatal hygiene, immediate and appropriate treatment of toxemias, correction of malpresentations, appropriate treatment of cases of contracted pelvis, prevention of the onset of labor until as near term as possible, more skilled obstetric technic, and better immediate care of the new-born child, especially those born prematurely.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

THE PROBLEM OF THE VOLUNTARY HEALTH AGENCIES

RECENT statistics published in this *Journal* under the auspices of the Committee on Administrative Practice have made it clear that during the depression years, funds available for voluntary health agencies have decreased much faster than appropriations for official agencies. This must be a cause of grave concern since the voluntary health agencies, particularly the visiting nurse associations and preventive clinics, form an essential part of the public health program as a whole.

The health officer of a given community is the one person officially responsible to the people for the maintenance of its health services of all sorts. He should lead and direct the entire program, official and voluntary. If he is wise, however, he will in any given case utilize the particular agency which can carry on a given service most efficiently and most economically. In many instances, for example, the delegation of certain phases of public health nursing to visiting nurse associations which can carry such services on a generalized basis, has proved of great public benefit. Where this is the case it is entirely fitting and proper that such agencies should be aided by grants from the city treasury, made through and under the supervision of the health officer. If, however, the community through its voluntary funds does not make proper provision for its nonofficial health agencies, the health of the community will inevitably suffer.

It seems evident that in many communities throughout the country a more or less organized effort is being made to reduce the proportionate grants from Community Chest funds to the health agencies. This is in part a reflection of a general social viewpoint which favors the widest possible extension of government control in all fields. It is in part at least actuated by a desire to conserve Community Chest funds for the so-called " character building " agencies by shifting the health burden to the public purse. Although it is recognized that in many quarters the character building agencies may have been inadequately sup-

ported, we believe this tendency to reduce health agency support to be unwise and unfortunate. It may well be maintained that the care given to infants and young children by the public health nurses and the child health conferences definitely affects character building, just as do those institutions which provide leisure time activities in later life. All of us who are interested in the public health field should strive to see that the health agencies are not forgotten in the Community Chest program of the future.

TYPES OF THE DIPHTHERIA BACILLUS

IN 1931,[1] Anderson, Happold, McLeod, and Thomson devised a chocolate agar tellurite medium for the growth of the diphtheria bacillus, and by its use were able to divide the Klebs-Loeffler bacillus into three types—*gravis, mitis,* and "intermediate." They based their nomenclature on the relative severity of cases from which these types were isolated. Since that time a great deal of work has been done in England, which has in the main confirmed their findings, especially as regards the cultural characteristics of the three types of organism isolated. However, the findings concerning the type of cases from which these three varieties are isolated have been decidedly different.

The matter has been of sufficient importance to attract official attention, and in our review of the *Annual Report* of the Chief Medical Officer of the Ministry of Health for 1934,* we commented on some of the results. This report took up work done in London, Staffordshire, Edinburgh, Glasgow, Manchester, Hull, and other places. In certain articles it is stated that the clinical type due to the "intermediate" form is "only a little less severe" than that produced by *gravis.* Mild cases are observed from which either *gravis* or *mitis* are isolated and are clinically indistinguishable. In Hull and Leeds the *gravis* strain predominated. In Glasgow it was rare and *mitis* was common, while in Manchester the "intermediate" strains were most commonly found at the beginning of the study, but gave way later to *gravis* and *mitis.* In Staffordshire there was difficulty in classification, owing to the prevalence of atypical strains. In Edinburgh atypical strains were found, but were replaced later by "intermediates."

The correlation of the bacteriological findings with the clinical characteristics has, in the main, confirmed the original findings, though there have been many marked differences. In Manchester and Leeds the "intermediate" strains give a disease less severe than that produced by *gravis,* while in Hull, the "intermediate" strain shows a severity definitely between *gravis* and *mitis.* In London there was no evidence that the severest types of the disease were associated mainly with *gravis,* though later in the investigation an increase in the severity of the disease was noticed, and an increase in the prevalence of *gravis* strains was found.

The latest study[2] that has come to our notice is from Leeds, the city from which the original work emanated. Here again, the bacteriological findings agreed with those reported by the original investigators. There were no aberrant strains found and the "intermediate" types were 100 per cent typical. The report embraces 166 virulent strains isolated from typical cases of diphtheria occurring in Dundee and the surrounding district. The author, Dr. Murray, had 71 of these cases under his personal care. All the cultures fell clearly into one

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* *A.J.P.H.,* Jan., 1936, p. 76.

of the three classes; 66 *mitis*, 10 *gravis*, and 90 "intermediate." Of the *gravis* strain, 9 out of the 10 were isolated from mild cases, while the greatest majority of the severe cases were due to the "intermediate," the case mortality for this strain being 11.1 per cent against 3 for *mitis*, and 0 for *gravis*.

There can be little question that the work of Anderson, Happold, McLeod, and Thomson has a real public health significance in addition to its scientific interest. The difference in findings referred to points clearly to the need for further investigations in a number of different places in England as well as in other countries. Ever since diphtheria has been known we have recognized that some epidemics are more severe than others. In recent years several epidemics of extreme severity have been reported without any clear reason for the unusual virulence shown.

Ever since the discovery of diphtheria antitoxin by von Behring, in Germany, and Roux, in France, we have reposed serene in the belief that antitoxin was the sovereign remedy, and nothing said here is intended to question the fundamental soundness of this belief. Indeed it is strengthened by the work discussed, at least as far as experiments on animals go, since the antitoxin in general use has been found to neutralize the toxin of *mitis*, *gravis*, and "intermediate" types. In human beings, cases from which the *gravis* is isolated do not respond favorably to the use of antitoxin, while those due to *mitis* and "intermediate" are favorably influenced.

NOTE: The authors of the original paper stressed only the *mitis* and *gravis* forms which they spoke of as the "two principal forms of the diphtheria bacillus." They, however, recognized the "intermediate" form in from 5 to 10 per cent of their cases. It is of especial interest to note that the organism known as Park No. 8, which is so widely used in this country and others for the production of diphtheria antitoxin, and is famous for its consistent production of a toxin of high potency, falls into this group.

REFERENCES

1. Anderson, J. S., Happold, F. C., McLeod, J. W., and Thomson, J. G. *J. Path. & Bact.*, 34:667, 1931.
2. Murray, J. F. *J. Path. & Bact.*, 41:97–106, 1935.

PUBLIC HEALTH EDUCATION*

"Village of the Living Dead"—"Hundred of Miners' Lives Reported Lost from Silicosis, Occupational Disease; Congress Stirred; Employers Deny Unfairness."

Thus the *Literary Digest*, 354 4th Ave., New York, N. Y. (Jan. 25, 1936), presents to its readers the story of disease and death at Gauley Bridge, W. Va.

New York World-Telegram had pictures and a striking Rollin Kirby cartoon. Probably newspapers over the country carried news of the House committee hearing in Washington. And thus a public health situation was in the news.

Did any public health workers get any tie-up for a local dust and disease problem?

When Publicity Back-fired—In all probability Columbia University overplayed the announcement of the dental desensitizer which was in all the newspapers about a month ago. Dentists' patients have been led to expect far more than there is reason to believe the new formula can accomplish. At the best its practicable range of use seems to be far more limited than will be generally believed.

Dental groups may be counted upon for authoritative statements as quickly as the formula and technic for its use are adequately checked.

"The Great Destroyer of Life"—Under this title, Dr. J. D. Dowling, Health Officer, Jefferson County Board of Health, broadcast over Station WAPI, on January 16, 1936.

The significance of this event is the fact that in a 3 page talk, "syphilis" or "syphilitic" was mentioned 19 times, and "venereal" 4 times. Not once was "social disease" mentioned. "Ethical morality" and improvement of "the ethical and physical fiber of mankind" were advocated as well as medical prophylaxis.

The presentation was devastating in its picture of widespread significance of the disease.

Misrepresenting a Public Health Situation—Does not "social diseases" imply a moral rather than a public health problem?

When public health workers use the term are they handicapping a public health attack upon disease?

Writing for Listeners—Nine years of experience with one type of daily program is the background for an article on "Writing for Listeners," by H. C. Douglass. *Journal of Home Economics*, Mills Bldg., Washington, D. C. Nov., 1935. *30 cents*. Although written in terms of home economics our readers may readily broaden the application of several quotations:

> First, about selecting a topic. In general, a good rule seems to be to choose a small, specific subject rather than a broad, general one. The human mind can hold only so many ideas at a time, and its capacity is considerably cut when it is already partly taken up with the baby and the broom. Most effective radio talks are appetizers rather than full meals. They don't satiate the listener with so many nourishing facts that none has flavor; rather, they serve up one zestful bit of information that makes the

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

listener want to taste more. For example, a talk on modern scientific methods of canning is less likely to hold interest than one on the safe canning of the corn ready in the garden. The listener who finds this small definite piece of canning information valuable will want more when her other vegetables are ready to can.

As for the writing of the talk, no hard and fast rules exist, except the general rules of all good writing. A clear, pleasant, enthusiastic voice will often make dull script go over fairly well. But anyone who has the job of preparing radio talks for the average voice soon finds little writing tricks that make any talk more effective.

The style that has proved most successful over the air is simple, natural, and conversational, no matter how scientific the subject. That means simple, familiar words with the fewest possible technical terms, and it means short, easy, straight-forward sentences.

Just why so many home economics speakers avoid this simple style is a question. Radio managers say that scientists and teachers generally don't make interesting talks if left to their own devices. The scientist in front of the microphone is likely to talk as if he were addressing a learned scientific meeting, and the teacher as if she were in the classroom instructing the ignorant young. In fact, one well known radio director declared some time ago that it was easier to get a good talk over the air from a cowboy or a backwoodsman than a Ph.D. People without the so-called higher education often are able to express themselves more naturally and colorfully than those of us whose vocabulary has been changed by scientific and educational training. An unschooled person often knows all the tricks of good story telling and also knows how to use words to build a clear picture for his listeners. The village gossip talking over the back fence about the house-cleaning demonstration may give her neighbor a better picture of house-cleaning methods than the specialist herself could if she had only words to rely on.

When writing a radio talk one

. . . needs to come out of the laboratory and classroom and imagine that she is on her neighbor's porch just talking. She may have news to report, a story to tell, or advice to give. As a radio speaker she is a guest in her listener's home, and she must be a welcome guest if she wants to stay there long enough to finish her conversation. So she takes pains to make her talk interesting, cheerful, sympathetic, and not too long-winded.

Straight-forward statements help to hold attention.

The scientist or the textbook may say, "The study was made," but the radio writer will say, "I made it" or "We made it," or "She made it."

The first paragraph must win the listener.

The tendency in writing this paragraph is to make a formal introduction with a lot of vague generalizations on all phases of the subject—to beat around the bush instead of plunging in. This kind of a first paragraph is ideal for driving listeners away. A good start may be a bit of lively news or an anecdote or some quip to put the listener in good humor, or simply a statement of what the topic is and perhaps also why it was chosen. The important point is to catch the listener's interest. Then, the succeeding paragraphs develop the topic.

A usable reading list accompanies the article.

"Photographs Please!" — Thus pleads N.O.P.H.N. which has received numerous requests for photographs from writers, editors, visiting nurse associations, and other groups.

It has not been possible to keep an up-to-date, attractive supply of photographs on hand. Yet to represent public health nursing pictorially in an adequate way is surely a responsibility of the N.O.P.H.N. and it disturbs us when we are unable to fill requests and to know that the picture of the nurse that is finally published for nation-wide distribution may be totally wrong—a nurse in white, a nurse in high heels, a nurse sitting on the patient's bed, a nurse in uniform—smoking—all of which we have seen recently.

Will you share your pictures?

If you have any clear, glossy prints of the public health nurse at work—in office, home, clinic, school, industry, or just "on the way" in city or country, may we have a copy? If it is a picture we can use and if you have gone to any expense in getting an extra copy for us, we will gladly pay for it, and we will publish the names of contributors to this cause! With the picture will you please send us the following information:

(1) May we use the picture for publicity

purpose without credit to your organization? If not, how do you want the credit line to read?

(2) May we cut off some of the picture if only a part of it is needed?

(3) Is there a charge for the picture?

(4) Has the picture been used in any newspaper or magazine of wide circulation? If so, permission to use it must be obtained from the publisher.

Please send your pictures to the National Organization for Public Health Nursing, 50 West 50th St., New York, N. Y.

We quote all this because it applies equally to all phases of public health. *Much additional national as well as local space for public health topics could be secured if state and local agencies would send photographs to the nationals.* Acceptable photographs would float many a useful article. Many photographs could be used with captions only.

And numerous photographs could be used in other cities in place of local pictures. Of course, in such cases the users will carefully avoid giving any impression except that the photographs are typical of local people or conditions.

If you happen to have a photograph and you do not know where it would be useful, please mail to editor of this department who will pass it on to good advantage.

Please note the four items of information requested by N.O.P.H.N. We would add two requests for information:

(5) Can you supply additional prints (preferably glossy and unmounted)?

(6) Please give all the explanatory detail possible for each photograph.

A Tabloid Presents Venereal Diseases—The *Daily News* of New York City, with the largest newspaper circulation in North America, ran 4 full page articles on v.d. in the first week of February. Here are sample headings:

PARASITES OF MEDICINE. *Charlatans Prey on Seekers of Health.* Quackery is exposed in today's story on venereal diseases. It also frankly discusses prevention, symptoms, and treatment.

MAYOR AIDS DISEASE DRIVE. *City to Launch Anti-Venereal Campaign.* What is New York City doing to combat venereal diseases?

Here are the lead paragraphs of the first and last of the articles.

While you read this sentence more than one million men, women and children in New York City are suffering from venereal diseases. Syphilis infects about 378,000, and gonorrhea twice as many. The nation's victims total at least 19,000,000, or 15 per cent of the population.

Mayor LaGuardia sounded the call to arms yesterday for a conquest of syphilis and gonorrhea. In curt, steel-edged words he called on New Yorkers to mobilize for a city-wide anti-venereal disease crusade led by the Department of Health.

Millions for Health Education—Millions of pieces of printed matter were distributed by tuberculosis associations in 1935.

Exclusive of the Christmas Seal Sale the National Tuberculosis Association published 4,125,454 pieces at a cost of $23,501.07. Excluding 1,600,000,000 seals, the supplies for the Seal Sale totaled an additional 22,645,728 pieces, and the total cost was $112,905.93.

The publications included one book, 5,238 copies; 8 monographs, 22,030 copies; 9 pamphlets, 262,595 copies; 21 circulars, 660,672 copies; 32 reprints, 63,546 copies; 31 miscellaneous and unclassified publications, 219,171 copies; and 12 different Early Diagnosis Campaign publications, a total of 2,892,159 copies.

Not included above are the *American Review of Tuberculosis*, the *Tuberculosis Abstracts*, the monthly *Bulletin*, the *Journal of the Outdoor Life*, the monthly *News Letter* and the annual volume of *Transactions*.

Pasteur on the Screen—"The Story of Louis Pasteur," produced by Warner Brothers, is reviewed by Frank S. Nugent in *New York Times*. Feb.

10, 1936. The *Times* can be found in many public and college libraries.

The dramatic department of the *Times* confesses to heresy. As Mr. Nugent says:

> It believes that accuracy is not the most important part of biography. It will accept errors of time and place cheerfully, and it will condone the addition of known fiction to known fact provided these untruths are committed in the interests of a greater truth, which would be the preservation of spirit—not the chronological letter—of a man's life.
>
> "The Story of Louis Pasteur" telescopes the French scientist's years and highlights his achievements. It embroils him in a prolonged feud with the French Academy of Sciences and its president. It has him incur Napoleon III's displeasure and virtual banishment from Paris. It delays his recognition until the evening of his life. It portrays him as a model of scientific detachment, the laboratory method personified, a modest, academic, self-effacing man.
>
> Most, if not all, of this is against the weight of such biographical evidence as one might encounter in staid Britannica or in the more lively pages of Paul De Kruif. And yet, possibly because we have heretical notions, we believe that Warners' "The Story of Louis Pasteur" is an excellent biography, just as it is a notable photoplay, dignified in subject, dramatic in treatment, and brilliantly played by Paul Muni, Fritz Leiber, Josephine Hutchinson, and many other members of the cast.

Advising versus Educating—For a full perspective read "The Nurse's Opportunity to Teach Parents," by W. Rand. *Public Health Nursing,* 50 W. 50th St., New York, N. Y. Nov., 1935. *35 cents.* But here is set forth the difference between advising and educating.

> It is easy for the nurse to give advice; it is much less easy for the nurse to teach. "You ought to bring your baby to the clinic, Mrs. Brown, to see the doctor." Quickly said, often *not* acted upon, perhaps many times acted upon because a personal relationship, valuable in many ways, has been established between the nurse and Mrs. Brown. Mrs. Brown brings the baby to the clinic because she likes the nurse and wants to please her, although she may not continue to do it when the nurse moves to another district. But is that education? No, that in itself is not education although it may be a first step, for education may result from the experience of the clinic and later contacts. Much less easy, more time consuming even, is it to give uneducated Mrs. Brown some understanding of what the clinic may mean for her and her baby. There must be the marshalling together of facts which the nurse has and which perhaps are only available to Mrs. Brown through the nurse, and the presenting of them in such a way that Mrs. Brown understands them and realizes that they apply to her and her baby, that they are of real significance to *her.* Conviction which leads to action is not just an intellectual process. There is something of an emotional coloring, a feeling tone which is a necessary part of the process and must not be ignored. One can intellectually agree to the reasons why adequate rest is important but one will not take adequate rest until one *feels* one needs it, until the intellectual process has taken on that emotional coloring which means a result in action.

"To Contact" or Not "to Contact"—Shall we contact people, or shall we use a verb which is accepted as such by dictionaries and grammarians?

Shall we write and speak English according to the rules, *following* the crowd only when by crowd usage a noun has become a verb as well?

Or shall we speak and write according to our own convenience, whether or not English purists agree with some of our usage?

School Lunches in Massachusetts—In that state the Federation of Women's Clubs, Red Cross chapters, Selectmen's Association, Consumer's League, American Legion, Boy Scouts (note the range of the coöperating groups), as well as the Departments of Education and Extension, have worked with the Department of Health on a school lunch survey, and the improvement of school lunches in the state.

What was done and much of what

was accomplished is reported in "The School Lunch Survey in Massachusetts," by H. I. Duff, in *Journal of Home Economics*, Mills Bldg., Washington, D. C. Nov., 1935. *30 cents.*

Among the contributory services were panel discussions of selected groups in Boston and in Springfield. A week's summer conference on management was held.

During the last year the Department of Public Health has sent out various bulletins, papers, posters, and other lunchroom helps for teachers, lunchroom managers, school principals and superintendents, nurses, and community organizations. It has also arranged for radio talks and newspaper and magazine articles to increase general interest in and understanding of the school lunch program.

Teaching the Tb. Patient—This is the subject of *Tuberculosis Abstracts* for March, 1936.

When the doctor secures the admission of his patient to a sanatorium his primary object is to secure optimum conditions under which the repair of the damaged lung may be effected. But he has every right to expect also that the sanatorium perform another function which is sometimes overlooked or done in a perfunctory manner, namely, education of the patient. The following abstract of a paper, originally addressed to sanatorium physicians and their staffs, will interest also the general practitioner.

" . . . the superintendent of the sanatorium should be, in effect, educator as well as doctor. Every one of his assistants, nurses, orderlies, and servants is a teacher under his supervision and shares with him the responsibility.

What should the tuberculous patient be taught? His curriculum might be divided into three main groups: (1) a way of life, (2) an understanding of tuberculosis, particularly *his* tuberculosis, and, (3) knowledge of how to protect others."

Dr. H. E. Kleinschmidt, the author, says:

The third broad grouping of the patient's training has to do with the prevention of the spread of his disease. Furnishing a patient with a sputum cup and installing an incinerator may be the alpha of prophylaxis, but it is not the omega. He should learn of course why such scrupulous attention is paid to sputum disposal. But he should learn also the numerous ways in which tubercle bacilli migrate from one person to another. He should develop automatic habits of safety—something akin to the surgeon's "aseptic conscience." To learn by rote that kissing, spitting, the use of common eating utensils, etc., are "verboten," as well but not enough.

It is better to teach simply and clearly the general biology of the disease, the manner in which the germ gets from one person to another, and how it does its deadly work. Give the average person an understanding background and a few specific examples, and he will, himself, regulate his conduct to the best interests of others and his own good.

From an understanding of his own tuberculosis and the desire to avoid infecting his loved ones and friends, is but a short step to the cultivation of an interest in the larger problem of combating the pandemic, tuberculosis. Every patient who leaves the sanatorium should have a good grasp of the broad epidemiologic picture of tuberculosis. The graduate of a sanatorium should be a crusader striking his blows in season and out of season. In him burns an everlasting fire. There are thousands like him. Against the cumulative effect of such force the old, old enemy is bound sooner or later to crumble.

For a copy apply to any tuberculosis association.

Need for Education: Baltimore Speaking—The occasional use of polluted water for drinking purposes is one illustration of the following statement in *Baltimore Health News* (Oct., 1935):

In each community there are certain health hazards which cannot be readily controlled or eliminated by the health department, but which can be avoided by the citizens themselves providing the dangers have been pointed out. If the public understands and coöperates in taking the precautions that may be necessary, those menaces which are less amenable to health department control can be mitigated to a far greater extent than is otherwise possible. Public health education or teaching the lessons of how to keep well is thus a vital function of the health department which should seek by all possible means to teach the public how to guard against health dangers.

Need for Education: North Carolina Speaking—Fantastic "cures" are described in *Health Bulletin,* North Carolina State Board of Health (Sept., 1935), with this statement by the editor:

In the recent epidemic of infantile paralysis, or poliomyelitis, the officials of the State Board of Health have learned a good many things. Some fundamental scientific facts were reëmphasized and stressed anew, and some old fakes which have been operating for many years took on new life. Out of it all one thing seems clear, and that is, the need for better scientific education in the high schools of the state on such matters of everyday importance as the prevention and the spread of disease, also the great need for a better informed public and a more discriminating one when it comes to appraising the value of the thousand and one remedies offered for the most part by people who are totally ignorant of the diseases for which they have cock-sure cures.

Same Slogan, But Different Emphasis—The 1936 Early Diagnosis Campaign of the tuberculosis associations will repeat the slogan of last year: "Fight tuberculosis with modern weapons." Last year the "weapons" discussed were the elements in treatment. In 1936 the presentation will return to early diagnosis as a chief weapon.

We shall retell it with a new inflection and emphasis, and we shall include in our story what is not yet generally known, namely, that the doctor today is able, because of modern weapons, such as the X-ray, to be more precise in his diagnosis than was formerly the case.

A second aspect of the theme to be developed will be that of anticipating tuberculosis before any symptoms appear. To go to the doctor promptly because of a cough that hangs on, loss of weight, or fatigue, is good; to go to him before these evidences of actual danger appear is still better. It pushes the fight back nearer to its source. Modern weapons, such as the tuberculin test and the X-ray, together with modern ways of using these weapons practically and economically must be made known to, and accepted by, the people if we are to clinch the fight. Tuberculosis is still the chief cause of death in the productive period of life—15 to 45. Routine search for early symptomless tuberculosis among students of colleges and high schools and among young people in industry, is the key to the attack in this sector. In this campaign we wish to make the procedure of routine examination with the tuberculin test and X-rays known to parents, educational leaders, doctors, and all who are concerned in the welfare of young people.

The Health Education Committee urges that the E.D.C. be considered as an all-year educational project and not limited to 1 month's activity. Plan your campaign carefully now and if possible lay out a calendar schedule.

Folders and pamphlets, posters, and other supplies will be available through the state tuberculosis associations.

The National Tuberculosis Association will, as in previous years, further the campaign through national channels. Articles will be released to national syndicates; magazines will be offered special articles and cuts; national radio broadcasts will be given. Samples of the booklets will be sent to state health officers, together with a letter soliciting coöperation.

The National Association will also furnish, from time to time, mimeographed material consisting of newspaper articles, radio talks, and other aids. Each month, beginning with April and ending with September, such "publicity kits" will be sent to the state association.

The announcement of the campaign advises that states "order with discrimination." Our suggestion is discrimination against use of the newspaper and magazine cut offered for the campaign. It seems to suggest the nightmare of a patient afflicted by aggressive modern weapons.

Contests in Minnesota—First, there was the 1935 Radio High School Public Speaking Contest. This was the fifth annual contest sponsored by the Minnesota Public Health Association, the Woman's Auxiliary of the Minnesota State Medical Association, and Station WCCO, as a part of the Christmas Seal educational campaign.

Local preliminary contests resulted

in 108 high schools each sending a talk for the state contest. Of these, 10 were broadcast over WCCO, and the manuscripts of 13 others received honorable mention.

Second, was the contest for a cover design for *Everybody's Health*, published by the same Minnesota Public Health Association, St. Paul. The 150 entries came largely from schools, although the ages of contestants ranged from 7 to 76 years.

A School Health " Thermometer " —From Celia Moore, Division of Child Hygiene, Texas State Department of Health, Austin, comes a mimeographed description of a device for enlisting teachers and pupils.

An easily made " thermometer " registers group and individual credits which cover minimum essentials in health training and instruction, control of communicable disease, school plant and equipment.

The device and its uses are easy to understand as described in detail.

Massachusetts Cancer Program—This is the title of a new 6 page pamphlet from Massachusetts Department of Public Health, Boston. The program:

Statistical studies; clinics; hospital; education.

The education program is described as follows:

In order to carry out our instructions to disseminate knowledge to every individual in the state a coöperative cancer control committee is either established or is in the process of being established in every one of the more than 350 communities. This committee is composed of a small central group or steering committee, and a larger group contacted directly by the central committee, and finally, every individual in the community. The steering committee is composed of key people who have friendly and vital contacts with every type of group and individual represented in the community—religious, political, labor, foreign, social, fraternal, patriotic, and service. The members of this steering committee contact representatives of every club in the community. These clubs promise to have at least one meeting a year on cancer. A club does not have to have an impressive membership to become corporate in this plan. The small group of 8 or 12 is an ideal size. The group, itself, determines the type of cancer talk it will have. Some groups prefer a formal talk followed by a question period while others prefer the round-table discussion with the physician during which questions are asked. In any case a question period is desirable. It is at these small group conferences where an individual feels free to ask questions about cancer where the real basic educational work is done.

The local physician is the one who is asked to be the teacher in this program because the decline or increase in early detection of cancer is entirely in his hands, because he will obtain more coöperation from his community if it knows exactly what to do in case of early symptoms and what the early symptoms are, because the local physician knows his community, and because it has always been the natural prerogative of the physician to teach.

The accompanying chart shows the organization of a coöperative cancer control committee in a city of 50,000 or over. With some modification, this plan can be extended to include the smaller communities.

Printed matter is offered; radio broadcasts are given at irregular intervals; a monthly bulletin is available to physicians.

Physicians Lecture on Public Health—The sixth annual series of free public health lectures has been given in Cleveland by the Albert Fairchild Holden Foundation and the Academy of Medicine of Cleveland. Topics:

Mentality and crime . . . High blood pressure . . . The relation of teeth to health and appearance . . . The crippled child.

State Department House Organs —House organs or periodical bulletins reach us from 19 states. They are issued weekly, twice a month, monthly, bi-monthly, or quarterly. Printed or

mimeographed, they run from 4 to 40 pages an issue.

The popular printed page sizes are 6 by 9 inches, and 8½ by 11 inches, but there are many differences in looks and in quantity of material carried.

Their functions, as expressed by the contents, are diverse, or in a few cases, not obvious to the outsider.

Massachusetts, Texas, and the Philippines will be mentioned later. We do not receive the bulletins issued by New York, Florida, and possibly others not listed here.

Arizona: " The welfare of the people is the supreme law." The January issue contains a discussion of water analysis, and statistical tables. Monthly, 4 pages.

California: Recent issues have included a leading article: Psittacosis, bodily resistance and lowered vitality, health and government, or coccidioidal granuloma, etc.; weekly morbidity reports; brief official notices, or other health news, or quotations. Weekly, 4 pages.

Connecticut: "For a clean state and a healthy people." January issue contains reports of two radio talks; several official statements; statistical tables; topics of popular broadcasts for the month. Monthly, 20 pages. (32 pages in December.)

Illinois: February 1 issue contained brief articles, based upon state statistics, on hazards to male and female, physical efficiency, smallpox in Illinois, tuberculosis in cattle, babies fared well last year, the cost of safeguarding milk, the enigma of tuberculosis, together with a limited mortality table. Semi-monthly, 4 pages.

Iowa: The Oct.-Dec. issue is devoted to " The control of tuberculosis in Iowa," covering both the public and the private agency program. Quarterly, 20 pages.

Kentucky: Nearly every issue carries a photograph or cartoon sketch on the cover page. January issue presents infant and preschool child health conferences, social hygiene in the health program, anterior poliomyelitis in Kentucky during 1935, restaurant pests and their control, typhoid carrier work in Kentucky, along with brief information and news paragraphs. Monthly, 12 pages.

Maryland: February issue is devoted to 1935 mortality reports. Monthly, 8 pages.

Michigan: December issue includes articles reviewing 1935, what mental hygiene has to contribute to the understanding of children, whooping cough (diagnosis and control), index for the year, condensed mortality tables. Monthly, 20 pages.

New Hampshire: January issue covers the need of restriction on excessive drafts of water from lakes and ponds, artificial coloring of oranges, government investigation of manufacture of orange beverage bases, artificial color in orange juice drinks deemed an adulterant, Hinton test for syphilis, statistical report of maternity, infancy and child hygiene, and the quality and selection of toilet tissue. Monthly, 12 pages. (New Hampshire usually gives more attention to food and drink than do other states.)

New Mexico: December includes a brief holiday message, the state director's page, the bureau of child welfare, the rôle of the nurse in communicable disease control (from New York State), district health officers' conference, news items about nurses with magazine references available through the Nursing Bureau Loan Library, the community sanitation program, a letter reporting a piece of local health work, and several news paragraphs. Monthly, 9 pages, mimeographed.

North Carolina: " This Bulletin will be sent free to any citizen of the state upon request." January issue contains material on mental health, gen-

eral hygiene and mental hygiene (11 pages from Iowa bulletin), unavoidable (?) accidents (newspaper editorial), and a statement about early diagnosis and treatment of syphilis. As is usual, a photograph appears on the cover page. Monthly, 16 pages.

Ohio: January 15 issue includes the usual column of brief paragraphs ("The Line O' Light"), chicken pox a differential problem, fads and fancies in diets usually dangerous to follow, broadcast topics for month ahead, scarlet fever control tried through cultures, vitamins are a vital aid in the control of rickets, boy coaster overcome by carbon-monoxide fumes, carbon-monoxide poisoning makes a big jump in Ohio, call issued for papers for state medical meeting, sanitary engineering actions taken in December, several paragraphic fillers. Semi-monthly, 4 pages.

Oregon: Two inside pages give weekly morbidity reports by counties, and two outside pages present objectives of mental hygiene, chicken pox, scarlet fever, or other subject. Weekly, 4 pages, mimeographed.

Pennsylvania: "This journal is free to the people of Pennsylvania. A request to the Editor will bring a copy of this magazine to your home without charge." Nov.-Dec. issue carried an editorial on human hibernation, nutrition-calories-costs, the Health Gnome Says (as usual), the polio problem, what housing means to health, the narcotic problem, the Christmas Seal, Department news, and vital statistics comment. Many illustrations. Bi-monthly, 40 pages.

Tennessee: November issue carried articles on plans for increased immunizations, tuberculosis in Tennessee, and malaria control. Monthly, 4 pages.

West Virginia: January issue has New Year verses, a review of 1935 by Department divisions and bureaus, explanation of new state laboratory ruling, staff changes, state news, quotations from President Roosevelt applicable to health workers, announcements of professional institutes. Monthly, 5 mimeographed legal size sheets unstapled.

Wisconsin: Oct.-Dec. issue included public health strides promised through new state legislation, supervision of well drilling a new state function, new legislation for barbers, hotels, and restaurants, classification and pathogenicity of certain yeast-like fungi with special reference to monilia, industrial waste treatment, CCC camps as body and morale builder, sanitary engineering report, health work among Indians, newspaper editorials quoted, communicable disease mortality comment, quarterly mortality report and informational fillers. Quarterly, 32 pages.

DATES AHEAD

March, 1877: "the first visiting nurse started her rounds to the sick poor."

March 29–April 5: National Negro Health Week. Address: National Negro Health Week, U. S. Public Health Service, Washington, D. C.

April 1, April Fool's Day: An opportunity to remind the public of the many people who fool themselves in health matters?

April 12: "the first dispensary opened its doors in Philadelphia in 1786."

April 15: incorporation of National Child Labor Committee in 1904.

April 25–May 2: National Boys' and Girls' Week. Address: at 35 E. Wacker Drive, Chicago, Ill.

April 26–May 2: Better Homes in America Week. Address: in care of Purdue University, West Lafayette, Ind.

May 1: May Day-Child Health Day. Address: your state department of health.

Detailed suggestions for use of above

dates will be found in "News Almanac for Social Work." Community Chests and Councils, 155 E. 44th St., New York, N. Y. *50 cents.*

NEW

Health Officers News Digest, Public Health Committee of the Cup and Container Institute, 30 Rockefeller Plaza, New York, N. Y. "Readers are frankly warned that this publication is propaganda," says Editor Homer N. Calver. Health workers will wish to see a copy.

RADIO

Usually health workers may secure mimeographed copies of broadcasts via Illinois, Baltimore, Connecticut, and Jefferson County.

American Medical Assn. has been changed from the Blue to the Red network of NBC, via WEAF, and certain additional stations, at 5 P.M., eastern standard time, and Pacific network at 2 P.M., Pacific time. This is a dramatized program with incidental music under the general theme of "Medical Emergencies and How They Are Met." Some of the programs are broadcast on short wave through KDKA, Pittsburgh, over W8XK, 11,870 and 12,210 kilocycles. Recent topics have been:

Common household emergencies . . . Tuberculosis . . . Hunting accident . . . Infantile paralysis . . . Diphtheria . . . Scarlet fever . . . Health of the traveler . . . Pneumonia . . . Little tips on home hygiene . . . Heart disease.

Baltimore City Health Department (Tuesdays):

Figures that talk (vital statistics for 1935) . . . Winter sports, exercise, and keeping well . . . Through a pasteurizing plant with a milk inspector . . . Health and physical education in the public schools.

Connecticut State Dept. of Health (WTIC, Thursdays at 1:25 P.M.):

Focusing on the disease germ (what the laboratory reveals) . . . Pneumonia . . . Reducing health hazards in industry . . . Water pollution and the public health . . . Studying the cancer problem . . . Habits which cause irregular teeth.

Illinois State Dept. of Health (WGN, Mondays; WHFC, Saturdays):

No one need die of tuberculosis . . . A new problem of public health workers (diabetes) . . . The new science of phenotypology in medicine . . . Every man his own quack doctor . . . Yesterday and today in medicine . . . Echoes of world war enemies (trench mouth) . . . Outstanding progress in medicine in 1935 . . . Science progresses in brain knowledge . . . The newer "magic" of medicine and heart disease . . . Health today and tomorrow.

Jefferson County Board of Health, Birmingham (WAPI, Thursdays at 10:15 A.M.):

Bedtime for school children . . . The great destroyer of life (syphilis) . . . On catching a cold.

Minnesota State Medical Assn. (WCCO, Minneapolis and St. Paul, every Monday at 10 A.M.):

Value of colonic irrigations . . . Toothache . . . Diet and health . . . Care of the eyes.

Ohio State Dept. of Health (WOSW, Tuesdays at 2:30 P.M.):

Analysis of the annual occupational disease report . . . Population changes as indicated by vital statistics . . . Scarlet fever.

BOOKS AND REPORTS

Immunology—*By Noble P. Sherwood, Ph.D., M.D. St. Louis: Mosby,* 1935. 600 pp. Price, $6.00.

The book is written for medical students and others of comparable background and has developed from mimeograph forms used in such classes. All of which may account for the practical and usable nature of the material presented. A tremendous lot of information is crowded into a relatively—according to present-day standards—short book. It is information concisely and simply presented and arranged in such a fashion as to enable the reader to make use of it in a minimum period of time.

The 3 opening chapters deal with Infection and Infectious Agents, Host-Parasite Relationship, and Anatomical and Physiological Factors in Infection and Resistance of the Individual. In this section—as in others—definitions are freely given and every effort made to present the facts in a simple manner.

With this background, the chapters which follow treat of inflammation and tissue immunity, humoral and cellular defenses, hypersensitiveness, the mechanisms underlying antigen-antibody reactions, and procedures. There are 4 chapters on antigens—their structure and specificity. A short chapter on colloids gives fundamental information and comes just before the discussion of the mechanism of antigen-antibody reactions, a discussion which must assume some knowledge of colloids and their behavior.

Four chapters on Hypersensitiveness conclude the book and are given this place because it is felt that the "present theories pertaining to the complex problems inherent in allergy" are better understood if preceded by discussions of antigen-antibody reactions in general.

The literature has been thoroughly reviewed, the material sorted and reduced, and only the essential conclusions presented. However, complete references are given at the end of practically all chapters and the original papers may be consulted for more detailed information.

It is altogether a book to be recommended to the medical student or to any other person interested in the subject of immunity. The student will find confusing situations cleared up and it should stimulate him to further knowledge.

The book is printed on good paper and is of convenient size.

ANNA DEAN DULANEY

A Textbook of General Bacteriology—*By Edwin O. Jordan, Ph.D. (11th ed.) Philadelphia: Saunders,* 1935. 825 pp. Price, $6.00.

A book that has reached its 11th edition has given proof of its value, and there remains little to be said about it, either in the way of criticism or of praise.

This latest edition has been entirely reset. A number of the chapters, like those on Immunity, Streptococci, Salmonella, Brucella, Rickettsia and on Spirochetes, have been modified and added to, while the section on The Viruses and Virus Diseases has been practically rewritten.

The author feels that the problem of nomenclature is largely unsettled, and hesitates in his book to use names

that have not won fairly general acceptance. Apart from this it may be said that the book maintains the high standard of previous editions. It is beautifully printed and abundantly illustrated, and will doubtless hold the place it has had for so long as one of our leading American textbooks.

MAZŸCK P. RAVENEL

Reports of the National Quarantine Service. Series V, 1934—*Edited by Wu Lien-Teh and C. Y. Wu. Shanghai: National Quarantine Service,* 1935. 233 pp. Price, $2.00.

The fifth series, or 1934 Reports, of the National Quarantine Service of China is edited by the Director, Wu Lien-teh, and C. Y. Wu, the Senior Quarantine Officer. The reports contain 8 original articles relating principally to plague, cholera, and leprosy, and an address by the Director entitled, "The Private Medical Practitioner in Relation to Public Health" —which are all of general interest. The rest of the book contains Divisional Reports, Branch Station Reports, and a list of personnel, which are of local interest, together with the Special Reports on the new quarantine station at Woosung, the Central Cholera Bureau, and analyses of special investigations of human cases of bubonic plague.

In the first of the original articles Dr. Wu Lien-teh briefly summarizes significant epidemiological features of various plague epidemics which have occurred in North and South China. He observes that pneumonic plague is conspicuous in the North. Bubonic plague in China is thought to be transmitted almost exclusively by the *X. cheopis*. In the South, plague is considered on the wane, but some apprehension is expressed that the development of rapid transportation may enhance the dissemination of plague in North China.

Dr. C. Y. Wu relates the existing data on the prevalence of rat fleas in China. Rather continuous surveys are being conducted in 7 ports and the results lend support to the Madras observations of King and Pandit regarding climatic variations of flea incidence. Charts are presented to demonstrate the seasonal distribution of rat fleas correlated with the occurrence of human plague in China.

Dr. J. W. H. Chun presents an analysis of the cholera problem in China. A review of the more important epidemiological studies made in connection with past cholera epidemics indicates that cholera is endemic in China and that recent epidemics are most likely of domestic origin.

Dr. R. Pollitzer, Microbiologist of the National Quarantine Service of Shanghai, reports observations on the behavior of cholera and cholera-like vibrios in blood and milk media. The cholera-like vibrios were taken from routine samples of drinking water collected in Shanghai and the studies are directed toward revealing their true relationship. The results are chiefly of technical interest in a highly important but as yet an unsolved and perplexing epidemiological problem.

Dr. J. W. H. Chun records an analysis of 37 heat stroke cases which were admitted to the Chinese infectious disease hospital at Shanghai during the June and July, 1934, heat wave when the wet bulb temperature remained above 80° F. for 26 consecutive days. The analysis treats different aspects such as age, sex, symptoms, mortality, methods of treatment, duration of hospitalization, etc.

Dr. F. S. Wong and Dr. C. Y. Wu ably discuss the medical inspection of vessels, including emigrant ships, in China. This is of particular interest to health officers.

Dr. Lee S. Huizenga presents a brief but interesting history of leprosy in China. China has some of the oldest

records of mankind and it is indicated that peaks in leprosy incidence occurred B.C. 5000, 1000, 500 and A.D. 250, 600, 1600 and 1930.

The reports reveal the remarkable growth of the National Quarantine Service, which was organized in 1930, and it appears that the apparently insurmountable economic and other difficulties are being overcome with amazing rapidity. F. A. CARMELIA

Free Medical Care, Socialized Medicine—*Compiled and edited by E. C. Buehler. New York: Noble and Noble,* 1935. 360 pp. Price, $2.00.

This book, compiled by the Directors of Forensics at the University of Kansas, is useful. Apparently the selections are made impartially. On the one hand we have articles by Fishbein, Editor of the *J.A.M.A.*, who we believe represents fairly the attitude of the medical profession in general in opposing socialized medicine. On the other hand, there are articles by Ray Lyman Wilbur, Chairman of the Committee on the Costs of Medical Care, as well as by some of those who were engaged in getting out that report. It will be remembered that the committee split three ways in making their report.

There is an interesting chapter which gives outlines of 25 different forms of socialized medicine already adopted in various parts of the United States and Canada. There is a fairly full collection of the reports and resolutions regarding socialized medicine by the American Medical Association, the American College of Surgeons, the American Dental Association, and both the Majority and Minority Reports by the Committee on the Costs of Medical Care.

The controversies in the ranks of the medical profession over this question seem to be meat for those engaged in forensics in the universities. We need only to recall the debates which are going on throughout this country on the subject. We cannot blink the fact that the subject is engaging the attention of many people in this as well as other countries. As a source book this collection can be recommended. It is well printed and put together.

MAZŸCK P. RAVENEL

The Single Woman and Her Emotional Problems—*By Laura Hutton. Baltimore: Wood,* 1935. 151 pp. Price, $2.00.

This little volume, by a physician at the Institute of Medical Psychology, in London, packs into 147 pages more of intelligent understanding and sympathetic insight into the problems confronting the single woman of today, in England and America at least, than this reviewer has ever seen anywhere. It makes no pretense to discussion of the complicated factors, physical, mental, and social, that lie back of the predicament in which thousands of women in our contemporary civilization find themselves, though enough is given to set the problems in proper perspective and to indicate the author's rich background of knowledge and experience. But it goes straight to the point, and deals with the emotional and psychological problems which develop out of the type of adjustment to life which the single woman, willy-nilly, is forced to make.

The basic problem, says Dr. Hutton, is *loneliness,* of the soul-destroying kind brought about by the frustration of a woman's deepest instincts, and which no amount of congenial work or business and professional associations can assuage. It is *personal* relationships that a woman wants, human beings with whom she can share emotional satisfactions, and it is this need that lies back of the irrational behavior so often exhibited by the single woman in her relations with other people. In a

most illuminating chapter, Dr. Hutton discusses her emotional friendships and the problems to which they give rise. Two following chapters discuss the sexual problems of women and sexual inversion or homosexuality candidly and clearly, in a manner that could give offense to no one, and will certainly be of great help and encouragement to women who are struggling with the situations here considered. A final brief chapter on "Adjustments" pulls the entire discussion together and gives some further constructive suggestions regarding the handling of her problems by the woman herself.

We commend the thoughtful perusal of this book to all intelligent people, whether they are in direct contact with the problems it discusses or not. WINIFRED RICHMOND

Lewis' New Air Conditioning for Comfort—*By Samuel R. Lewis. (2nd ed.) Chicago: Keeney Publishing Co.,* 1935. 277 pp. Price, $2.50.

This is a practical book which should prove very useful to engineers concerned with the design and installation of air conditioning systems, and which, if supplemented by handbooks, periodical literature and catalogs, would provide them with the material needed. It is not a textbook which goes deeply into the underlying theory. Clarity and order are its keynote and tempo. The mathematics required for its use do not go beyond arithmetic and simple algebraic equations.

Diagrams, tables, charts, and numerical working examples are abundant. The use of the psychometric table as being more efficacious than the chart is stressed. Consideration of cooling, humidifying, etc., in relation to heating is maintained while clarifications in their relationships are suggested.

Its contents include air conditioning systems, humidifying and dehumidifying, refrigeration for air conditioning, heat transmission and incidental sources of heat, air supply and distribution, water circulation in heating and cooling systems, examples of heating and cooling commercial buildings and houses, and operating costs.

The volume would have the same kind of function in a public health engineer's library as would a good handbook on plumbing. It is too brief to be an exhaustive treatise but it is a fine outline which condenses a great deal of information not otherwise available in assembled form. CHARLES L. POOL

The Human Foot—*By Dudley J. Morton. New York: Columbia University Press,* 1935. 244 pp. Price, $3.00.

The author has taken a long step forward toward placing the study and treatment of foot imbalance on its proper plane of importance and dignity. This book is a distinct contribution to medical literature. The purpose of the book as clearly stated in its preface is a study to identify and analyze the primary factors of functional disorders of the foot. The study has been carried out in three parts: The Evolution and Development of the Human Foot, The Physiology of the Human Foot, The Functional Disorders of the Human Foot.

Under the heading of evolution and development Morton discusses in a most exhaustive and convincing manner the evolution of the human foot from its earliest beginning in the fish up through the amphibian, reptilian, mammalian and early primate periods to the completely developed human foot as it is today. The material contained in this section of the book indicates that an exhaustive research and investigation has been carried out and the subject matter constitutes the most authoritative presentation of evolutionary data on the foot with which we are acquainted.

Under physiology, the function of the foot, both static and in locomotion, is discussed and the extremely interesting conclusions reached are supported by carefully established facts. The conclusions drawn regarding the part played by the muscles of the leg and foot as supports to the arches of the foot are especially interesting and important since they differ widely from many accepted opinions of today. This section contains a very careful study of the mechanism of the foot in standing, walking, and running.

Functional disorders of the foot are considered from two points of view: structural defects and environmental factors, such as general conditions under which the individual lives, and footwear. Three fundamental structural defects are listed as primary causative factors: (1) Short first metatarsal bones; (2) Posteriorly located sesamoid bones; (3) Hypermobility of the first metatarsal segment. Morton explains most of the imbalance which occurs in the foot on the basis of these structural defects although later he adds a fourth—shortened calf muscles. The chapter on treatment is most suggestive since the methods advocated for correcting or counteracting the effects of structural faults in the foot are based on the basic pathology present as determined by the author's investigation. Foot-wear is adequately discussed and the influence of environmental factors thoughtfully dealt with.

It is impossible in a short review to attempt to indicate the completeness and thoroughness of the study which has been carried out and the importance of the observations made. It may be said, however, that Morton's work has raised the diagnosis and treatment of foot conditions from a plane which has been largely empiric to one with a real physiological basis. Not all orthopedic surgeons may be willing to accept in their entirety the conclusions Morton has arrived at but all can profit from a study of this work. In addition to its technical excellence, the subject matter is clear and well coordinated and makes delightful reading. Typographically the publishers have produced an excellent book with copious illustrations.

FRANK D. DICKSON

Pioneering with the Red Cross—*By Ernest P. Bicknell, Vice-Chairman in Charge of Insular and Foreign Operations, The American Red Cross. New York: Macmillan,* 1935. 281 pp. Price, $2.00.

This is a travel and adventure book in connection with great emergencies which occurred in nearly all parts of the world from the time of the San Francisco Earthquake, 1906, to the getting of American refugees out of Europe with the beginning of the World War in 1914, with many personal anecdotes—amusing, dramatic, and some truly awful. It is a narrative in which the author, who started as a newspaperman, became an early organizer of State Charities in Indiana (1893–1898), then Superintendent of the Bureau of Charities of Chicago (1898–1908), and finally National Director of the American Red Cross. It is a story of intimate personal contacts with presidents, cabinet members, kings, queens, princes and princesses, generals and admirals, great business executives, politicians, noted charity, civic, and religious workers, revolutionary leaders, and outlaws.

A master organizer, in simple and straightforward language, interwoven with many facts and figures, relates great cataclysms, general and personal dangers, the meeting of embarrassing situations, graft, audacious opponents, and oftentimes a misinformed public. He recites in detail how these were faithfully and fearlessly met and overcome or assuaged as befitted the occa-

sion. Operations were carried on, oftentimes almost without funds. Mobs were subdued and their energies shaped to useful ends. Well meaning but foolish or ignorant donors and would-be helpers often proved as great problems as the emergencies.

What could be more embarrassing than to have the millers of Minneapolis send enough flour to San Francisco in 1906 literally to block the avenues of transit and to suffice the inhabitants for 10 years! Or, the case of the Yakima farmer who placed a note in a sack of potatoes (of which that fertile Washington valley sent trainloads to Ohio flood sufferers in 1913), and who received, later, a letter from an irate Cincinnatian who had paid full price for the potatoes on the open market, and to have a great Oregon newspaper get hold of the incident—with all the explanation which had to follow—and yet everything was strictly "according to Hoyle," when the facts became known.

No moving picture ever spun its tale more interestingly, or with better themes or more rapid changes of scene. The mine disaster, the forest fire, the volcano which burst without warning in far away Luzon, border warfare and intimate glimpses of the Madero-Villa revolution, ship disasters, etc., and the parts played by women and nurses, doctors and hospitals, philanthropists and governments, railroads and battleships, and so on without end.

The reader gains a coherent idea of the evolution of the American Red Cross during its formative years and, in the aftermaths of catastrophes, the triumph of case work over stultified relief. The development of the Christmas Seals as a means of funding local and national Red Cross, and especially tuberculosis work, forms an interesting interlude.

We have in this volume the memories of a man who was constantly being "found out" and called to greater responsibilities. A study of the bases upon which he made his decisions is worth any one's time. A suitable index accompanies. EMERY R. HAYHURST

Mother and Baby Care in Pictures—*By Louise Zabriskie, R.N. Philadelphia: Lippincott,* 1935. 196 pp. Price, $1.50.

This highly pictorial book is a new adventure in placing before expectant parents the essentials of prenatal care, preparations for confinement, delivery service, and care of the new-born. It covers a wide range of subject matter from the time of conception through each stage of development into infancy and early childhood.

Each section is profusely and beautifully illustrated. The photographic reproductions could scarcely be improved. The captions and descriptions are so clear that any mother can carry out the details.

There is only one possible objection which might be raised by certain of the medical and nursing profession. That is the series of pictures in Chapter VI, which show in detail the various steps in the delivery. What the reaction of the younger generation, who demand a knowledge of all facts, may be can only be surmised. Their parents and the "old family doctor" certainly would expurgate pages 68–71. But this experimental venture should not prejudice us against the whole book, which is exceedingly well prepared by one who has had a wealth of experience in the whole field of obstetric nursing. RICHARD A. BOLT

Public Health Administration in the United States—*By Wilson G. Smillie. New York: Macmillan,* 1936. 458 pp. Price, $3.50.

"This book is dedicated to the Pioneers of the Modern Public Health Movement in the United States, who in

1872 founded the American Public Health Association and at that first meeting laid the foundation stones on which Public Health Administration in the United States has been built."

Dr. Smillie, an experienced and independent research student in administrative health procedures and their results, and a teacher of distinction at the Harvard School of Public Health, has made convenient for health officers and all others concerned with the practice of this specialty of the medical sciences, a long awaited handbook of current health procedures.

He offers factual description rather than critical analysis of the conduct of health departments in this country, with supplementary comment upon the nonofficial health agencies. He stops short of dealing with international health relations, which some readers will regret.

He is particularly courageous, definite, and satisfying in dealing with the desirability of locating school health supervision under a department of health rather than a department of education.

The book will be useful to many physicians and nurses not members of official or nonofficial health agencies, as well as to teachers, editors, and publicists of a wide variety. References, quotations are well chosen, the contents and index adequate and convenient, the form and matter appropriate for the purpose of the volume.

Dr. Smillie is to be complimented upon his priority in this field in the United States, as well as on the excellence of this first edition.

HAVEN EMERSON

BOOKS RECEIVED

LENGTH OF LIFE: A Study of the Life Table. By Louis I. Dublin and Alfred J. Lotka. New York: Ronald Press, 1936. 400 pp. Price, $5.00.

SOCIAL SECURITY. By Edward H. Ochsner. Chicago: Social Security Press, 1936. 231 pp. Price, $.50.

THE GROWTH AND DISTRIBUTION OF POPULATION. By S. Vere Pearson. New York: Wiley, 1935. 448 pp. Price, $4.00.

CRIME, CHARACTER AND EDUCATION. By Sidney J. Beer, Inglewood, Calif. Author, 1935. 190 pp. Price, $1.00.

LOBAR PNEUMONIA AND SERUM THERAPY. By Frederick T. Lord and Roderick Heffron. New York: Commonwealth Fund, 1936. 91 pp. Price, $1.00.

VITAMINS. IN THEORY AND PRACTICE. By Leslie J. Harris. New York: Macmillan, 1935. 240 pp. Price, $3.00.

YOU MUST EAT MEAT. By Max Ernest Jutte. New York: Putnam, 1936. 164 pp. Price, $2.00.

THE DIAGNOSIS AND TREATMENT OF PULMONARY TUBERCULOSIS. By John B. Hawes and Moses J. Stone. Philadelphia: Lea & Febiger, 1936. 215 pp. Price, $2.75.

PRINCIPLES OF HYGIENE. Revised edition. By Thomas A. Storey. Stanford University Press, 1935. 524 pp. Price, $3.50.

YOUR CHILD IN HEALTH AND IN SICKNESS. By Hugh L. Dwyer. New York: Knopf, 1936. 333 pp. Price, $2.75.

DISEASE AND DESTINY. By Ralph H. Major. New York: Appleton-Century, 1936. 338 pp. Price, $3.50.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Midwifery and the Frontier Nursing Service—Among other interesting facts, a survey of the second series of supervised births reveals no maternal deaths from any causes, in spite of the fact that 193 mothers had puerperal complications during pregnancy, 277 during labor, and 83 during the postpartum period.

ANON. Tenth Annual Report. Quart. Bull., Frontier Nursing Service, 11, 1:13 (Summer), 1935.

More Pro BCG—Health records of Canadian infants vaccinated with BCG are so much more favorable than those of an unvaccinated group that the author is forced to conclude that vaccination must be included as a part of a complete anti-tuberculosis program.

BAUDOUIN, J. A. Vaccination Against Tuberculosis With BCG Vaccine. Canad. Pub. Health J. 27, 1:20 (Jan.), 1936.

Rural Midwifery — Picturing the practice by midwives in a rural Virginia county, this survey is typical of country conditions no doubt. Twelve years of midwife instruction appears to have produced precious little in the way of results.

DANIEL, J. L., and GAFAFER, W. M. The Rural Midwife: Her Social and Economic Background and Her Practices as Observed in Brunswick County, Virginia. Pub. Health Rep. 50, 52:1807 (Dec. 27), 1935.

For Better Public Health—Brief references to historic plagues emphasize the author's point that progress in public hygiene follows advances in medical research when properly trained administrators undertake socially justifiable projects. A fine paper.

DRINKER, C. K. Problems and Progress in Public Health. Pub. Health Nurs. 28, 1:10 (Jan.), 1936.

When Two Can Give Artificial Respiration—For artificial respiration, an arm lift movement carried on by a second operator is suggested as a supplementary mechanism to the prone pressure method. The French navy has already adopted this scheme.

DRINKER, C. K., and SHAW, L. A. A Modification of the Neilson Method of Artificial Respiration. J. Indust. Hyg. 17, 6:243 (Nov.), 1935.

Hearing Life Tick—As physiology, which underlies all of hygiene, is a subject in which most of us are woefully weak, this description of recent studies in the mechanism of protoplasm will prove worth careful reading. Incidentally, it is an excellent example of the possibility of putting into plain English a subject as obtruse as biophysics or physical chemistry.

GRAY, G. W. Machines which Imitate Life. Harper's Magazine, 172, 2:341 (Feb.), 1936.

Mental Health of Mothers—All who care for postpartum patients should be aware of the significance of mental health, the symptoms of deviation, and the help which is needed. This is discussed in detail, points being well illustrated by case stories from a visiting nurse association.

HASTINGS, G. L. Mental Hygiene of the Postpartum Period. Trained Nurse & Hosp. Rev. 95, 6:549 (Dec.), 1935.

Pro State Medicine—An account by a physician of an organiation for medical relief set up in a mid-western county that has reduced cost and improved service to the satisfaction of the patients and physicians.

KNISKERN, P. W. Our Town, M.D. Survey Graphic, 25, 1:34 (Jan.), 1936.

Less Syphilis, More Gonorrhea—Fewer pregnant women with syphilis, reduction in clinic admissions and cases reported, and a similar drop in neurosyphilis lead to the conclusion that the disease really is less prevalent in Massachusetts. Marked increases in reported gonorrhea have occurred during the same 5 year interval.

NELSON, N. A The Decreasing Prevalence of Syphilis in Massachusetts. J.A.M.A. 106, 2:105 (Jan. 11), 1936.

Children of the New-Poor—This distressing paper concludes that those who have been viewing with alarm the increased fertility brought on by dependency have probably been exercising themselves over something that did not happen. Things have come to a pretty pass when a heartless researcher dares to pull the props out from under one of our best birth control platforms!

NOTESTEIN, F. W. The Fertility of Populations Supported by Public Relief. Milbank Memorial Quart. 14, 1:37 (Jan.), 1936.

Effective Syphilis Control at Last—After 20 years of struggle, one health department has been granted increased funds to attempt a real state-wide syphilis control program to provide adequate facilities for diagnosis and treatment, improved case supervision, complete epidemiologic investigation, and professional and public education.

PARRAN, T. Syphilis Control in New York State. Milbank Memorial Quart. 14, 1:57 (Jan.), 1936.

Preparing the Nurse for Parent Education—A discussion of what the nurse needs to know about normal children—their growth and development, and about family and community life, if she is to be prepared for parent education. The use of the nursery school by schools of nursing, and the carrying over of nursery school methods into hospital practice is suggested.

RAND, W. What Constitutes a Preparation for the Nurse in Parent Education. Am. J. Nurs. 35, 12:1176 (Dec.), 1935.

In Praise of Meat—This Arctic explorer tells us that others who have had to live on fresh seal, fish or penguin meat did not suffer from scurvy even when deprived of supposed essential antiscorbutics. Total absence of caries from those who live wholly on meat is definite. Cessation of decay occurs when transferred from a mixed to meat diet. Many other virtues are ascribed to meat.

STEFANSSON, V. Adventures in Diet. Harper's Magazine, 172, 1:178 (Jan.), 1936.

How to Control Venereal Diseases—All essential procedures for a state or local venereal disease control program are set forth briefly in the statement of the recommendations of an eminent committee. Adequate diagnostic and treatment facilities, epidemiologic and educational projects are, of course, included. The plan was pretty generally accepted in principle more than a dozen years ago, but it bears repeating since it appears about to be tried somewhat belatedly at least in one state.

VONDERLEHR, R. A., *et al.* Recommendations for a Venereal Disease Control Program. J.A.M.A. 106, 2:115 (Jan. 11), 1936.

Health and Depression—As would be expected, the food of families upon relief and in the lowest income groups in 1933 was deficient chiefly in milk and vegetables. The caloric values were also inadequate.

WIEHL, D. G. Diets of Low Income Families Surveyed in 1933. Pub. Health Rep. 51, 4:77 (Jan. 24), 1936.

Rural Typhoid Prevention—Thirteen years of a rural typhoid fever vaccination program combined with projects for the improvement of rural sanitation produced a marked improvement in the typhoid case rate with no deaths during the last 5 years. Surrounding areas without adequate health administration enjoyed no such decreases.

WILLIAMS, W. C., and BISHOP, E. L. The Typhoid Control Program and Results in Thirteen Years' Work in Williamson County, Tennessee, 1922–35. Pub. Health Rep. 51, 1:1 (Jan. 3), 1936.

Heated Dust vs. Appetite—That odors have an effect upon human health and comfort is the inescapable conclusion to be drawn from the evidence offered.

WINSLOW, C.-E. A., and HERRINGTON, L. P. The Influence of Odor Upon Appetite. Am. J. Hyg. 23, 1:143 (Jan.), 1936.

ASSOCIATION NEWS

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Robert E. Archibald, M.D., 23 Red Rock St., Lynn, Mass., State District Health Officer
Edgar B. Beaver, M.D., County Health Dept., Gallup, N. Mex., Health Officer, District No. 2
Max Bernstein, M.D., 345 E. 116 St., New York, N. Y., District Health Officer
Arthur I. Blau, M.D., 108 W. 136 St., New York, N. Y., District Health Officer
H. Warren Buckler, M.D., 806 Cathedral St., Baltimore, Md., Director, Division of School Hygiene and District Health Officer
F. Edward Burke, M.D., Wakefield, R. I., Health Officer
Dr. R. Frank Cary, Dawson, Ga., Terrell County Commissioner of Health
Donald G. Evans, M.D., C.P.H., 422 Malden Ave., Seattle, Wash., Director of Child Hygiene, City Health Dept.
William H. Hill, M.D., D.P.H., Calgary, Alta., Canada, Medical Officer of Health
John L. Jones, M.D., Court House, Medina, Ohio, Medina County Health Commissioner
Clarence T. Roome, M.D., 2741 Cuesta Rd., Santa Barbara, Calif., City Health Officer
Richard L. Russell, M.D., P. O. Box 148, Springfield, Mo., Greene County Health Officer
Gilbert E. Seaman, M.D., Winnebago, Wis., Superintendent, Winnebago State Hospital
James P. Sharon, M.D., 610 State Bank Bldg., Fort Dodge, Ia., Director, Venereal Disease Control, Webster County
George H. Zerbst, M.D., Manning, S. C., County Health Officer

Laboratory Section

Howard A. Ball, M.D., San Diego County Hospital, San Diego, Calif., Director of Laboratory
Kathryn Barron, B.S., Braden Castle, Manatee, Fla.
Kenneth P. Cash, B.S., City Hall, Lawton, Okla., Health Officer and Chemist
Rolland D. Fox, B.S., 703 Municipal Bldg., Akron, O., Director of Health Dept. Laboratories
Hazel B. Gillespie, B.S., 310 Cedar St., New Haven, Conn., Brady Laboratory
David W. Horn, Ph.D., P. O. Box 666, Bryn Mawr, Pa., Chemist to local suburban boards
C. William Janson, M.A., Cross Highway, Westport, Conn., Director, Diagnostic Bacteriological Laboratory
Einar Leifson, Ph.D., Department of Pathology, Johns Hopkins Medical School, Baltimore, Md., Instructor in Bacteriology

Marian G. Sprick, B.S., 442 Sinclair Ave., N.E., Grand Rapids, Mich., Bacteriologist, Pertussis Immunization Project, Michigan Dept. of Health

Vital Statistics Section

Martin B. Woodward, M.D., State Board of Health, Columbia, S. C., Director of Bureau of Vital Statistics

Public Health Engineering Section

William G. Christy, M.E., Court House, Jersey City, N. J., Smoke Abatement Engineer, Hudson County

Lloyd K. Clark, B.S., State Health Dept., Bismarck, N. D., Sanitary Program, U. S. Public Health Service

H. A. Nordquist, Hobart Mfg. Co., Troy, Ohio, Development of Effective Methods of Cleansing Tableware

Industrial Hygiene Section

James M. Carlisle, M.D., Merck & Co., Inc., Rahway, N. J., Industrial Medicine and Hygiene

Samuel Kahn, M.D., 30 Beekman Place, New York, N. Y., Medical Examiner, New York State Labor Dept.

Charles S. Slocombe, Ph.D., 29 West 39 St., New York, N. Y., Personnel Research Federation

Paul F. Stricker, U. S. Dept. of Labor, Washington, D. C., Safety Engineer, Division of Labor Standards

Food and Nutrition Section

R. Hugh MacDonnell, B.S., 420 Lexington Ave., New York, N. Y., Head of Central Laboratory, Quaker Maid Company

Ira A. Manville, M.D., Ph.D., 7208–34 Ave. S.W., Multnomah, Ore.

William H. Stoner, M.D., Burroughs Wellcome & Co., Tuckahoe, N. Y., Research Consultant

Public Health Education Section

Dorothea Campbell, State Health Dept., Charleston, W. Va., Director, Bureau of Public Health Education

Albert E. Fossier, M.D., 1208 Maison Blanche Bldg., New Orleans, La., Bureau of Medical Education, City Board of Health

Bertha S. Mason, M.D., 82 S. 17 St., San Jose, Calif., College and School Health Work

James G. Stone, 122 E. 7 St., Los Angeles, Calif., Executive Secretary, Los Angeles Tuberculosis and Health Assn.

Elbert W. Wright, M.D., Bowie Clinic, Bowie, Tex., Chairman, State Board of Health

Public Health Nursing Section

Mary Bedford, R.N., Gibson County Health Dept., Trenton, Tenn., Supervising Nurse

Ellen Coffey, R.N., 2849a Accomac St., St. Louis, Mo., Staff Nurse, Municipal Visiting Nurses

Loretta W. Converse, R.N., 63 Dutton Ave., San Leandro, Calif., School Nurse

Laura A. Murphy, R.N., 539 E. 9 St., Erie, Pa., Supervisor of Tuberculosis, Erie Visiting Nurse Assn.

Marian G. Randall, 40 Wall St., New York, N. Y., Technical Staff Member, Division of Research, Milbank Memorial Fund

Mariana H. Ward, R.N., 17 E. 37, Savannah, Ga., Visiting Nursing Supervisor, Savannah Health Center

Epidemiology Section

Martin R. Beyer, M.D., 2006 N.W. 39 St., Oklahoma City, Okla., State Epidemiologist

William R. Carroll, Ph.D., Bacteriology Department, University of Florida, Gainesville, Fla., Professor of Bacteriology and Immunology

Leonard A. Dewey, M.D., C.P.H., Portales, N. Mex., District Health Officer

Lynne A. Fullerton, M.D., 404 Federal Bldg., Spokane, Wash., District Medical Officer, Indian Service

Gerald E. McDaniel, M.D., C.P.H., State Board of Health, Columbia, S. C., Epidemiologist

James D. Trask, M.D., New Haven Hospital, New Haven, Conn., Associate Professor of Pediatrics, Yale University School of Medicine

Unaffiliated

Wendy Stewart, M.D., 445 S. Kingsley Drive, Los Angeles, Calif., Teaching Course in Public Health Law, University of Southern California, School of Government

Barta Wold, R.N., 143 W. 4 St., Williamsport, Pa., Executive Secretary, Lycoming County Tuberculosis Society.

NEWS FROM THE FIELD

FLOATING OF OYSTERS

THE recent action of the New Jersey Health and Sanitary Association Council on a matter of large public importance to New Jersey, draws attention to a very important subject in connection with the public health. The New Jersey association called a spade a spade.

A serious situation of the shellfish industry of New Jersey has grown out of a recent ruling by the U. S. Public Health Service barring from interstate traffic all shellfish originating in New Jersey. This ruling was occasioned by the action on January 14 of the New Jersey State Board of Health, permitting the "floating" of oysters in the Maurice River in South Jersey. This action of the Board of Health rescinded an order against the "floating" of oysters in this river about 2 years ago, based on the accepted fact that the river was polluted and that such a practice was a danger to health.

In announcing the action of the Public Health Service, it has been stated that "The reopening of the Maurice River area has caused the Public Health Service to feel that it cannot consistently continue to give its endorsement to sanitary control of the shellfish industry maintained by the state authorities in New Jersey." This brings the shellfish producers of New Jersey face to face with a critical situation, particularly since the ruling almost automatically prevents domestic as well as interstate sales.

According to the findings of the New Jersey Health and Sanitary Association, the present difficulty arises because of policies which in recent years have governed appointments to the State Board of Health. These appointments have recently been made in some cases from representatives of industrial, commercial, and agricultural interests, who may not be entirely free to ignore the effects that rulings and regulations of the State Department of Health may have on their particular enterprises.

Without questioning the integrity and intelligence of those who are members of the State Board of Health, the local association expresses its conviction that no person should serve as a member if the individual interests of that person may come into conflict with his official responsibility and his duty toward safeguarding the public health. It is their opinion that the shellfish representative now on the Board was placed there to protect the industry rather than to protect the public.

This action in New Jersey appears to be an example of what state associations may accomplish when they take their responsibilities seriously. It is a matter of record that other representatives of commercial interests have been appointed to places of responsibility in various communities, presumably with the purpose of preventing certain actions which may be in the interests of the public health. Fortunately in this instance the Public Health Service is in a strategic position and can properly hold the whip hand. It would be safe to surmise that the shellfish representative on the New Jersey State Board of Health now sees his position in a new light.

NOTE: It is gratifying to learn that on February 11 the New Jersey State Board of Health rescinded its resolution permitting storage of shellfish in the Maurice River and that the federal ban was raised on February 14 for other shellfish from New Jersey.

NEW YORK STATE SEWAGE WORKS ASSOCIATION MEETING

THE Eighth Annual Meeting of the New York State Sewage Works Association was held in New York City, January 14 to 17, with headquarters at the Hotel Astor.

Linn H. Enslow, of New York, F.A.P.H.A., was elected President, and Charles C. Agar, of Albany, Vice-President. Arthur S. Bedell, of the New York State Department of Health, Albany, member A.P.H.A., was reappointed Secretary-Treasurer.

One feature of the program was the presentation, by President Morris M. Cohn, of Schenectady, member A.P.H.A., of the Kenneth Allen Memorial Awards for 1935 to Samuel I. Zack for the most meritorious paper of a technical and research nature, and to Harry H. Hendon, of Birmingham, Ala., member A.P.H.A., for the best paper on sewage plant operation presented during the year. Mr. Hendon presented a paper on "Chemical Treatment during 1935 at Birmingham, Ala.," at the afternoon session, supplementing his paper presented at the previous annual meeting. Mr. Zack presented a paper on "Operating Experiences at Perth Amboy, N. J." and the discussion on these two papers was opened by F. W. Gilcreas, of Albany, member A.P.H.A., and Linn H. Enslow.

The spring meeting of the Association will be held at Lido Beach, L. I., early in June.

DR. HUGH S. CUMMING RETIRES AS SURGEON-GENERAL

HUGH S. CUMMING, M.D., Sc.D., LL.D., retired on February 1 from the post of Surgeon-General of the U. S. Public Health Service, in which he has served since 1894. Dr. Cumming's appointment as Surgeon-General dates from 1920; he was nearing the completion of his fourth consecutive term in that capacity.

Dr. Cumming has been a member of the American Public Health Association since 1914 and was made a charter Fellow in 1922. He served the Association as President in 1931.

Among the outstanding advances made by the U. S. Public Health Service during his administration may be listed the completion of the national quarantine system, the inauguration of pre-immigration examinations at American consulates, the establishment of a national leprosarium and a national narcotic farm, and the construction of 8 marine hospitals. The National Institute of Health was also created from the former Hygienic Laboratory during his term.

Dr. Cumming has also been deeply interested in the promotion of international health work and as Vice-President of the Health Section of the League of Nations, as American member of the Office International d'Hygiene Publique, as United States representative of the Pan-American Sanitary Convention, as director of the Pan-American Sanitary Bureau, and as President of the Allied Medical Mission to Poland, he has rendered distinguished service.

YELLOW FEVER VOLUNTEER DIES

THE daily press of February 10 carried news of the death of Levi E. Folk, who was one of those who submitted himself to the bites of mosquitoes in the well known experiments of Walter Reed, in Cuba. He was 66 years old on February 7.

In 1933, when our Association met in Indianapolis and commemorated there the announcement made by Dr. Reed of his discoveries in 1900, Mr. Folk was one of the 4 survivors who attended. He must be remembered as one of the heroic men who risked his life in the demonstration of this great discovery.

A paper found among his effects told the story of his part in the fight.

"When yellow fever appeared amongst the troops at Columbia Barracks, Cuba," the paper said, "the surgeon (Dr. Reed) asked for volunteers to nurse it. I, with several others, volunteered and was at the yellow fever hospital until I left to go to Camp Lazear in the fall of 1900.

"From November 30 to December 19, 1900, I slept in a specially built house (built to keep out the mosquitoes), in which was placed a large quantity of bedding taken from the beds of patients sick with yellow fever in Havana. I did not suffer any ill effects from this experiment. On January 18, 1901, I submitted to mosquito inoculation and contracted yellow fever on January 23, 1901. After my recovery, I was bitten several times by infected mosquitoes to test my immunity. I did not become infected by any of the bites after that one on January 18, 1901."

NURSES CONVENTION

THE Biennial Convention of the American Nurses' Association, the National League of Nursing Education, and the National Organization for Public Health Nursing will be held in Los Angeles, Calif., June 21–26, 1936. The headquarters hotels for the three nursing groups will be as follows: Ambassador—American Nurses' Association, National League of Nursing Education; Biltmore—National Organization for Public Health Nursing.

ROYAL SANITARY INSTITUTE

ON behalf of the American Public Health Association the following cablegram was dispatched to the Royal Sanitary Institute, London, on the announcement of the death of King George.

> The American Public Health Association extends to the Royal Sanitary Institute sincere condolences on the passing of His Majesty King George V.

The following reply has been received by radio from the Royal Sanitary Institute:

> The Council of the Royal Sanitary Institute in special meeting assembled received the message of condolence from the American Public Health Association on the death of His Majesty King George, Patron of the Institute. They tender to the American Public Health Association sincere thanks for their sympathy in the sorrow the Institute shares with the Nation.

The large number of members of the American Public Health Association who are subjects of the British Crown have suffered a special loss which is shared by the entire world.

DAIRY, FOOD, DRUG OFFICIALS TO MEET IN FLORIDA

THE 1936 meeting of the Association of Dairy, Food and Drug Officials of the United States will be held at the Miami Biltmore Hotel, Coral Gables, Florida, November 9–12.

HEALTH WORKERS OF TENNESSEE

THE eighth annual conference of health workers of Tennessee was held January 30 to February 1, with a registration of approximately 250.

A. W. Freeman, M.D., Dean, School of Hygiene and Public Health, Johns Hopkins University, delivered a paper on "Accepted Policies in the Administration of a County Health Department." Another interesting paper was the one on records and reports by W. F. Walker, Dr.P.H., Director, Division of Health Studies, the Commonwealth Fund.

One morning was devoted to different phases of public health education.

J. P. Leake, M.D., Surgeon, U. S. Public Health Service, gave two talks on epidemiology, his subjects being "Our Current Knowledge of Poliomyelitis," and "Futile Gestures versus Sound Procedures in Communicable Disease Control."

Other guest speakers were Pearl McIver, R.N., Martha Eliot, M.D., Clarence L. Scamman, M.D., and W. K. Sharp, Jr., M.D.

The conference also included an inspection of the new quarters of the State Health Department.

ORTHOPEDIC SURGEONS' EXHIBITS

AT the annual meeting of the American Academy of Orthopedic Surgeons, scientific exhibits were presented by 35 representative orthopedic surgeons. The exhibit of Henry H. Kessler, M.D., F.A.P.H.A., which won the Gold Medal Award, was on the "Cineplastic Operation," which deals with a special operation devised to utilize the remaining muscles in an amputation stump to activate an artificial hand. The exhibit consisted of photographs of cases, photographs of the operative procedure, and plaster models, as well as samples of the prosthesis. It also included motion pictures in color of the operation and the end results in several cases.

DR. GRIFFITH EVANS DEAD

THE London Letter of the *J.A.M.A.* for February 1, 1936, reports the death of Dr. Griffith Evans at the age of 100, at his home in Bangor, North Wales. Only a short time ago he celebrated his 100th birthday, at which time the late King George spoke to him by long distance telephone and offered his congratulations. Dr. Evans discovered the Trypanosoma Evansi, the first trypanosome recognized as the cause of a disease.

MOTHER'S DAY MAY 10

MOTHER'S DAY has taken on added significance during the past few years because of the movement to bring to the attention of the nation the needless waste of life of mothers in childbirth and to develop better maternity care.

A special effort is being launched for the sixth time this year through the Maternity Center Association with the keynote: "Early and Adequate Care Reduces the Risks of Motherhood: Father Plays a Leading Rôle."

NEW JERSEY FATHER CONVICTED FOR REFUSING SON'S IMMUNIZATION

THE refusal of a father to allow his 6 year old son to be immunized against diphtheria resulted, on January 28, in the assessment of a fine of $50 and a sentence of 30 days in jail, in the Juvenile Court of Newark, N. J. According to press reports quoting Charles V. Craster, M.D., D.P.H., City Health Officer, this is the first occasion on which this provision of the State Child Welfare Act has been used to compel children to receive diphtheria prevention treatment. This section of the Child Welfare Act of 1915 defines as neglect, ". . . the failure to prevent the performance of an act necessary to a child's physical welfare." The conviction was secured in spite of the fact that argument indicated that there was no law establishing that immunization was necessary to the child's welfare.

INDUSTRIAL HYGIENE LABORATORIES

ON January 1, 1936, the Industrial Hygiene Laboratories of the Chrysler Corporation began operation. These laboratories, located at the Dodge Main Plant of the Chrysler Corporation, in Detroit, are devoted to the study of occupational diseases and their sources, together with other agencies and conditions of work leading to industrial health hazards. The laboratories are under the direction of Dr. Stewart F. Meek, as industrial hygienist, with Dr. Gordon C. Harrold, as chemist. The laboratories have been planned under the direction of Carey P. McCord, M.D., F.A.P.H.A., who remains associated in the capacity of adviser and consultant.

BOOKS FOR PARENTS

FOR the tenth time in as many consecutive years The Parents' Magazine has made an award for the most helpful book of the year for parents. On February 17, publisher George J. Hecht presented the 1935 medal to Dr. Winifred E. Bain, Assistant Professor of Education of Teachers College, Columbia University, for *Parents Look at Modern Education,* published by D. Appleton-Century Company.

OPEN AIR CONGRESS

THERE has been announced for July 18–23, 1936, the Third International Open Air School Congress, to be held at Bielefeld and Hanover, Germany, shortly before the Olympic games at Berlin.

A bulletin of the International Committee on Open Air Schools can be obtained from the General Secretary of the Congress in Bielefeld or through the Assistant Commissioner of the Office of Education, Department of the Interior, Washington.

CATHARTIC TO MIX IN BREAD COSTS $600 FINE

A POWERFUL coal-tar cathartic has no proper place in bread or any other product sold as a food. The Food and Drug Administration regarded phenolphthalein as an adulterant when it was used as an ingredient of what the manufacturer called a "laxative health bread." The federal court at St. Louis, Mo., agreed with the food officials and imposed a $600 fine on the three members of the Bakers' Research Co. who had been selling "Ownen's Viti-Veg" a mixture of flour, bran and between 10 and 12 per cent of phenolphthalein, a coal-tar cathartic. This mixture was recommended to bakers for addition to their regular bread mix. The product was to be marketed as "laxative health bread."

TESTIMONIAL DINNER FOR DR. WILLIAMS

ON January 22 the Baltimore City Medical Society, the School of Hygiene and Public Health of Johns Hopkins University, the Baltimore Association of Commerce and the Maryland Academy of Medicine and Surgery, united in a testimonial dinner at the Southern Hotel in Baltimore, to Dr. Huntington Williams, Commissioner of Health of Baltimore.

More than 200 physicians and others attended this dinner for which Dr. J. M. T. Finney, Sr., was toastmaster, and at which Hon. Howard W. Jackson, Mayor, Dr. Page Edmond for the Association of Commerce, and Dr. Allen W. Freeman for the School of Hygiene and Public Health, were speakers. Particular attention was paid to the fact that under Dr. Williams's administration the Department of Health has won the award for the largest population group in the 1934 City Health Conservation Contest, sponsored by the American Public Health Association in coöperation with the U. S. Chamber of Commerce.

HEART JOURNAL BECOMES MONTHLY

BEGINNING with the January, 1936, issue, the *American Heart Journal* is published monthly, instead of bimonthly as heretofore during the 10 years of its existence.

TUBERCULOSIS PREVENTORIUM FOR CHILDREN OPENED IN ARIZONA

A SCHOOL for children who are predisposed to tuberculosis has been opened in an abandoned Civilian Conservation Corps camp in the desert 15 miles from Tucson, Ariz. The school has been financed with WPA funds, the *New York Times* reported on January 20, and within 30 days will be caring for 150 boys and 212 girls, it is expected. Outdoor exercise, proper diet, rest, and health super-

vision will be combined with school studies. A large proportion of the children are from families of war veterans, it was stated.—*J.A.M.A.*, Feb. 8, 1936, p. 471.

NATIONAL HEALTH COUNCIL ELECTS OFFICERS

THE annual meeting of the National Health Council was held in New York on February 6.

Dr. Donald B. Armstrong was elected President of the Council, to succeed Colonel Theodore Roosevelt, who was relieved because of urgent and multiplying demands upon his time.

General officers elected are:

Vice-President—T. N. Pfeiffer, present incumbent.

Treasurer—Frederick Osborn, present incumbent.

Secretary—Professor Maurice A. Bigelow, of Columbia University.

Members of the Board of Directors elected are as follows:

R. M. Atwater, M.D., American Public Health Association; Colonel H. E. Bullis, National Committee for Mental Hygiene; L. H. Carris, National Society for the Prevention of Blindness; Dorothy Deming, R.N., National Organization for Public Health Nursing; Howard Green, National Committee of Health Council Executives; Kendall Emerson, M.D., National Tuberculosis Association; C. C. Little, Sc.D., American Society for the Control of Cancer; H. M. Marvin, M.D., American Heart Association; S. H. Osborn, M.D., Conference of State and Provincial Health Authorities of North America; William F. Snow, M.D., American Social Hygiene Association; F. N. Sperry, M.D., American Society for the Hard of Hearing.

At Large: George Baehr, M.D., New York Academy of Medicine; S. J. Crumbine, M.D., Formerly American Child Health Association; H. S. Cumming, M.D., U. S. Public Health Service; William DeKleine, M.D., American Red Cross; Louis I. Dublin, Ph.D., American Public Health Association; Livingston Farrand, M.D., President, Cornell University; Homer Folks, New York State Charities Aid Association; A. S. Knight, M.D., National Committee for Mental Hygiene; Colonel Theodore Roosevelt; Ray Lyman Wilbur, M.D., President, Stanford University.

CONFERENCE OF ILLINOIS HEALTH OFFICERS AND PUBLIC HEALTH NURSES

THESE were some of the outstanding thoughts expressed at the Annual Conference of Illinois Health Officers and Public Health Nurses which took place in Springfield, Ill., on December 10 and 11, with more than 500 delegates present:

Serum for the treatment of pneumonia (in appropriate cases) ought to be distributed free by every state department of public health. Immunization against scarlet fever with 5 doses of scarlet fever toxin is both effective and safe. Vaccine, properly prepared and preserved and given in sufficient dosage at the right time, should confer prolonged immunity against whooping cough in a high percentage of susceptible young children. When politicians or broken-down practitioners are employed as health officers there is no hope of providing the people in reasonable measure with the advantages and benefits of preventive medicine. Adequate and efficient public health service is a fine thing for good medical practitioners (as well as the public) but it is hard on the poor ones. School administrators must get it out of their minds that anyone can teach hygiene. A new philosophy concerning public health is taking root in the minds of governmental officials so that within the next 50 years public health work will be regarded as the first duty of government.

RED CROSS COURSES

American National Red Cross Teacher Training Courses for instructors in home hygiene and care of the

sick are held in coöperation with the following:

University of California at Los Angeles—June 27–August 7

Colorado State College, Fort Collins, Colo.—July 11–August 21

University of Minnesota, Minneapolis—June 15–July 26

Peabody College, Nashville, Tenn.—June 8–July 15

Pennsylvania State College, State College, Pa.—June 29–August 7

Syracuse University, Syracuse, N. Y.—July 8–August 14

All communications for information should be addressed to Public Health Nursing and Home Hygiene and Care of the Sick Service:

National Headquarters, American Red Cross, Washington, D. C. (for Eastern Area)

Midwestern Branch, American Red Cross, 1709 Washington Ave., St. Louis, Missouri (for Midwestern Area)

Pacific Branch, American Red Cross, Civic Auditorium, San Francisco, Calif. (for Pacific Area).

PERSONALS

ARTHUR W. HEDRICH, Sc.D., Fellow A.P.H.A., has been appointed Chief of the Vital Statistics Division of the Maryland State Department of Health. Dr. Hedrich has been for some years connected with the Biostatistics Department of the School of Hygiene and Public Health of Johns Hopkins University, Baltimore, Md., and will continue certain teaching in that institution. He fills the vacancy made by the appointment of John Collinson, M.D., D.P.H., F.A.P.H.A., to the position of Assistant Chief Statistician of the U. S. Bureau of the Census, Washington, D. C.

MILTON J. ROSENAU, M.D., F.A.P.H.A., who retired in 1935 as Professor of Preventive Medicine and Hygiene in the Harvard Medical School, Boston, has been appointed as of January 15, 1936, in charge of the Division of Public Health in the University of North Carolina School of Medicine, Chapel Hill. This division will coöperate with the State Board of Health, members of the executive staff of which will form part of the teaching staff.

MORLEY B. BECKETT, M.D., member A.P.H.A., has recently severed his connection with the Michigan State Department of Health in Lansing and become associated with the Kellogg Foundation.

LOUIS V. WALDRON, M.D., member A.P.H.A., has been appointed Commissioner of Health for the city of Yonkers, N. Y., to succeed Dr. William S. Coons, deceased. Dr. Coons served only a few weeks after his appointment in December, 1935.

V. K. VOLK, M.D., F.A.P.H.A., has recently been appointed Commissioner of Health and Medical Director of the County Contagious and Tuberculosis Hospitals in the Saginaw County Department of Health, Saginaw, Mich. Dr. Volk has recently been the Deputy Commissioner of Health of Pontiac, Mich. He began his new responsibilities on February 3.

JULIA GROSCOP, R.N., F.A.P.H.A., has been appointed Regional Public Health Nursing Consultant for the U. S. Public Health Service with offices at Chicago, Ill.

HAROLD S. DIEHL, M.D., member A.P.H.A., Professor and the head of the Department of Preventive Medicine and Public Health in the University of Minnesota Medical School and Graduate School, has recently been appointed Dean of the Medical Sciences.

ELMER V. MCCOLLUM, PH.D., Fellow A.P.H.A., Professor of Biochemistry and Head of the Department at Johns Hopkins University School of

Hygiene and Public Health, Baltimore, Md., has been presented with the Callahan Memorial Award by the Ohio State Dental Society, for his research in nutrition. The award is a gold medal given each year to a person "who has made a contribution to dental science which is of very exceptional value."

WILLIAM H. BRISTOW, of New Cumberland, Pa., has been appointed General Secretary of the National Congress of Parents and Teachers, with offices at 1201 Sixteenth Street, N.W., Washington, D. C.

FLORENCE FALLGATTER has been appointed as Chief of the Home Economics Education Service in the Vocational Home Economics Division, as announced by the Office of Education, U. S. Department of the Interior, Washington, D. C.

CHARLES W. FOLSOM, of Lafayette, Ga., member A.P.H.A., formerly Health Officer, Knox County, Ky., has been appointed to a similar position with the Walker-Catoosa County Health Department, Ga., succeeding Dr. Samuel P. Hall, Jr., who resigned.

ROBERT FRANK CARY, M.D., of Dawson, Ga., F.A.P.H.A., has been elected Health Officer of Terrell County.

HENRY GRADY CALLISON, M.D., of Augusta, Ga., F.A.P.H.A., has been named Health Commissioner of Augusta, and Dr. William A. Mulherin is Chairman of the Board.

DR. WILLIAM C. HUNSICKER has been appointed Director of Health of Philadelphia, and Dr. Alfred F. Allman, Assistant Director.

DOYLE E. HINTON, formerly Executive Secretary of the Delaware Anti-Tuberculosis Society, has been appointed to succeed Arthur J. Strawson as Executive Secretary of the Southern Worcester County Health Association at Worcester, Mass.

DR. IRMEL W. BROWN has been named Director of the Health Department of Kalamazoo, Mich., succeeding John L. Lavan, M.D., F.A.P.H.A., resigned.

WILLIAM H. PICKETT, M.D., of Saginaw, Mich., F.A.P.H.A., has resigned as Health Officer of Saginaw County, to accept a similar position in Florida.

CLARENCE COOK LITTLE, Sc.D., of Bar Harbor, Me., member A.P.H.A., Managing Director of the American Society for the Control of Cancer, has accepted the presidency of the American Birth Control League.

DR. ARCHIBALD BARKLIE COULTER has been appointed Director of the Bureau of Tuberculosis of the Health Department of the District of Columbia on a part-time basis. Dr. Coulter was recently named tuberculosis coördinator of the District.

DR. KARL V. QUINN, of Belchertown, Mass., has been appointed Assistant Commissioner of Mental Diseases for Massachusetts.

DR. SHERMAN S. FRAZIER, of Angola, Ind., has been appointed Secretary of the Angola City Board of Health, to succeed the late Dr. P. Norman Sutherland, who held the position for more than 25 years.

DR. ALVA L. SPINNING, of Covington, Ind., has been appointed Health Officer of Fountain County.

DR. WILLIAM BASIL KEELER, Medical Inspector for the South Boston Health Unit, has been appointed Health Commissioner of Boston, Mass., succeeding the late Dr. Francis X. Mahoney.

DR. HENRY T. DONOVAN has become the new Health Officer of Coffee County, Ala. The establishment

of the health unit in Coffee County makes a total of 57 health units, according to the press, in the State of Alabama, leaving but 10 counties without organized health service. This total of 57 represents a high record for Alabama, although by 1932, 54 counties had been organized. But during the depression 8 of these discontinued full-time service.

DR. JOHN CLIFTON, of Vermillion, Kans., has been appointed Health Officer of Marshall County, succeeding Dr. Charles E. Gaston, of Frankfort, resigned.

DEATHS

DR. JAMES S. WALTON, member A.P.H.A., District Health Officer of the New York State Health Department and former City Health Officer of Amsterdam, N. Y., died on February 19. He was 67 years old. Dr. Walton had practiced in Amsterdam for 35 years.

THEODORE F. FOSTER, M.D., member A.P.H.A., died on February 10. Until his illness a year ago he was Secretary of the Connecticut Public Health Association. Dr. Foster spent 2 years in Russia with the American Relief after the War and 3 years with the Tennessee State Health Department. He was a member of the Delta Omega.

DR. ADOLPH J. PISTOR, Chief of the Meat Inspection Division of the Bureau of Animal Industry, U. S. Department of Agriculture, died January 25, at the age of 59 years.

CONFERENCES AND DATES

Mar. 2–6, Twentieth Annual Session of the American College of Physicians, Detroit, Mich.

Mar. 25–28, American Society of Biological Chemistry, Washington, D. C.

Mar. 25–28, Federation of American Societies for Experimental Biology, Washington, D. C.

Mar. 25–28, American Society for Pharmacology and Experimental Therapeutics, Washington, D. C.

Mar. 29–Apr. 4, National Negro Health Week.

Apr. 1–3, Canadian Section of the American Water Works Association, Hotel Royal Connaught, Hamilton, Ont.

Apr. 8, Annual Meeting of the Massachusetts Tuberculosis League, Hotel Kimball, Springfield, Mass.

Apr. 9–10, American Association of Pathologists and Bacteriologists, Boston, Mass.

Apr. 9–11, American Association of Anatomists, Durham, N. C.

Apr. 15–18, American Physical Education Association Convention, Hotel Statler, St. Louis, Mo.

Apr. 22–25, National Tuberculosis Association, New Orleans, La. Meeting Headquarters, Municipal Auditorium; Residence Headquarters, Hotel Roosevelt.

Apr. 25–May 2, National Boys' and Girls' Week.

May 3–6, International Society for Crippled Children, St. Louis, Mo.

May 10, Mother's Day.

May 11–15, American Medical Association Convention, Kansas City, Mo.

May 11–15, 40th Annual Convention—National Congress of Parents and Teachers, Hotel Schroeder, Milwaukee, Wis.

May 14–16, American Water Works Association—Pacific Northwest Section, Aberdeen, Wash.

June 8–12, Annual Convention of American Water Works Association, Hotel Biltmore, Los Angeles, Calif.

June 10, Spring Meeting of the New York State Sewage Works Association, Lido Beach, L. I., N. Y.

June 21–26, Biennial Convention of the American Nurses' Association, the National League of Nursing Education, and the National Organization for Public Health Nursing, Los Angeles, Calif. Headquarters will be, respectively: A.N.A., and N.L.N.E., Ambassador Hotel; N.O.P.H.N., Biltmore Hotel.

June 22–25, Annual Meeting of the National Association of Master Plumbers, Buffalo, N. Y.

June 24–27, Seventh Annual Meeting, Western Branch, A.P.H.A.—meeting simultaneously with Canadian Public Health Association—Vancouver and Victoria, B. C.

July 6–11, The Royal Sanitary Institute, Southport, England.

July 18–23, Third International Open Air School Congress, Bielefeld and Hanover, Germany.

July 25–Aug. 1, The Second International Congress of Microbiology, London.

Sept. 8–10, International Union Against Tuberculosis, Lisbon, Portugal.

Oct. 12–17, The Dairy Industries Exposition, Atlantic City, N. J.

Oct. 19–22, Sixty-fifth Annual Meeting of the American Public Health Association, New Orleans, La. Meetings Headquarters, Municipal Auditorium; Residence Headquarters, Hotel Roosevelt.

Oct. 29-31, Annual Meeting of the Association of Military Surgeons, Detroit, Mich.

Nov. 9–12, Association of Dairy, Food and Drug Officials of the United States, Miami Biltmore Hotel, Coral Gables, Fla.

July 27–31, 1937 Second International Congress on Mental Hygiene, Paris.

American Journal of

Public Health

And The Nation's Health

Volume 26 April, 1936 Number 4

Poisonous Substances in Food

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Sixty-fifth Annual Meeting, New Orleans, La., October 20-23

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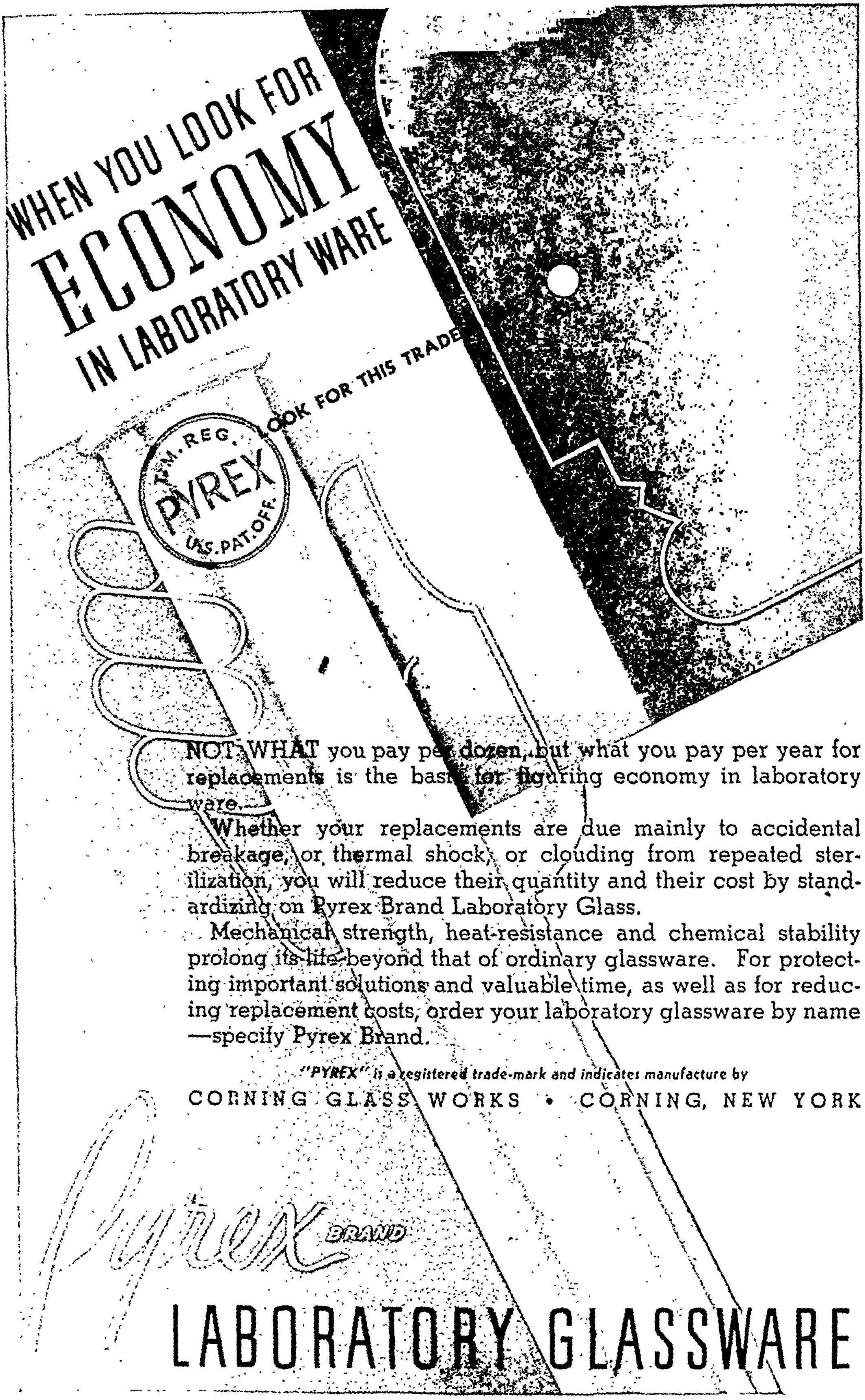
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American Journal of Public Health

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Official Monthly Publication of the American Public Health Association

Volume 26 — April, 1936 — Number 4

CONTENTS

Continued on page vi

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Readers' Guide in your library.

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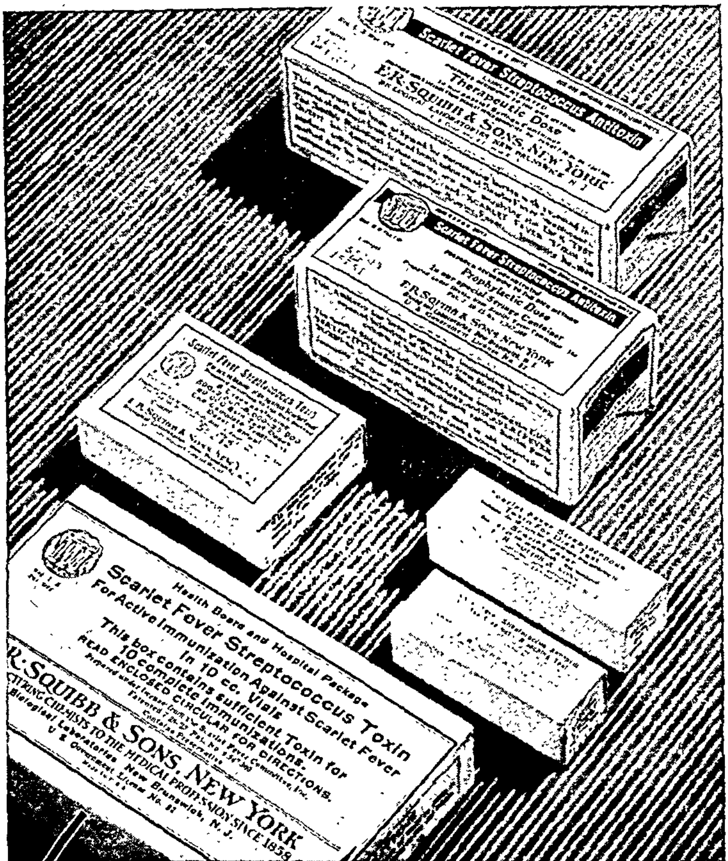

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Continued on page viii

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Contents—Continued PAGE

INDEX TO ADVERTISERS

MEETINGS OF AFFILIATED SOCIETIES

and A. P. H. A. Branches

Society	*Secretary*	*Place and Time of Annual Meeting*
Connecticut Public Health Assn.	Ira V. Hiscock	May, 1936
Florida Public Health Association	S. G. Thompson, D.P.H.	To be announced
Georgia Public Health Association	M. E. Winchester, M.D.	To be announced
Massachusetts Public Health Assn.	G. Donald Buckner, S.B.	Boston, January 28, 1937
Michigan Public Health Association	Marjorie Delavan	Lansing, November, 1936
Missouri Public Health Association	Dr. C. F. Adams	Columbia, Mo., September, 1936
New Mexico Public Health Assn.	Paul S. Fox	Carlsbad, May 6–8, 1936
Northern California Public Health Association	Dr. I. O. Church	To be announced
Ohio Federation of Public Health Officials	W. D. Bishop, M.D.	Columbus, November, 1936
Pennsylvania Public Health Assn.	J. Clarence Funk	May 19–21, 1936
South Carolina Public Health Assn.	Laura Blackburn	April, 1936
Southern California Public Health Association	Charles W. Arthur	To be announced
Texas Public Health Association	Lewis Bracy	Kilgore, October, 1936
Virginia Public Health Association	Dr. A. L. McLean	To be announced
West Virginia Public Health Assn.	John Thames, M.D.	October, 1936
Southern Branch, American Public Health Association	G. Foard McGinnes, M.D.	To be announced
Western Branch, American Public Health Association (joint meeting with Canadian Public Health Association)	William P. Shepard, M.D.	Vancouver and Victoria, B. C., June 24–27, 1936

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American Journal of Public Health
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Volume 26 April, 1936 Number 4

District Health Administration in Large Cities*

JOHN L. RICE, M.D., F.A.P.H.A., AND
MARGARET W. BARNARD, M.D., DR.P.H., F.A.P.H.A.

Commissioner of Health, and Director of District Health Administration, Department of Health, New York, N. Y.

A PUBLIC health program, to be effective, must be based on an intimate knowledge of the health problems of a given community, and must be adapted to its needs and resources. As a city grows in size and complexity, it becomes increasingly difficult for the health officer to meet these requisites, and some type of regional supervision of public health activities becomes necessary. Localization of clinic services, such as those in the maternity and child hygiene or tuberculosis fields, to reach population groups most in need of them, is an accepted practice. Official health departments in a number of large cities have gone a step further and have organized their resources administratively on a neighborhood or district basis, coöperating with medical societies and nonofficial health and welfare agencies. This makes it possible for the official agency to plan and administer a health program adapted to the particular needs of a given district and coördinated with the work of other agencies in the area.

New York City, with its 7,000,000 people living in an area of over 300 square miles, is an outstanding example of the need for district localization of health services. The enormous heterogeneous population with its varying density, and with its host of localized areas of custom, environment, understanding and thought, presents a challenging problem in effective public health administration and service. Those interested in public health have long recognized the necessity of developing an administrative technic which will point out the needs, resources, and opportunities in the varying sections of the city, and which also will render health work more effective by bringing it closer to the people.

After a number of years of study of the various field experiments and health demonstrations already in operation, New York City has adopted a program of district health administration in which health work eventually will be localized in 30 units of popula-

* Read before the Health Officers Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

tion of from 200,000 to 250,000. In January, 1934, a Bureau of District Health Administration was established, with a full-time director, and during the year a full-time district health officer was appointed to each of the 7 districts where health needs were greatest. The 7 district programs have been slowly interwoven with the general Health Department program and the health and welfare activities of their communities. Funds for 8 health center buildings have been made available by the Federal Public Works Administration. These buildings, which will be ready in the near future, will provide adequate headquarters and will be an important factor in stabilizing district health work. A typical building will provide space on the ground floor for functional services (maternity and child hygiene, dental, tuberculosis, and venereal disease). On the second floor will be located the administrative unit, Health Department nurses, and a visiting nurse unit. A station for the distribution of departmental supplies and biologicals will be established in the administrative office for the convenience of physicians in the district. On the third floor, in addition to the health education unit, space is provided for coöperating voluntary agencies working in the district. An auditorium in the basement will provide, either a large meeting place for about 250 people or, by subdivision, 3 conference rooms. Medical societies will be offered free use of the building for group or committee meetings, and in some of the centers it is possible to provide a special office for the local medical society in the district. At the request of several of the medical committees, a current health education display of material related to local conditions will be kept in each center.

One of the most important influences in the development of district health administration during the year has been the support and coöperation of the present city administration. Mayor La Guardia has repeatedly indicated his interest in the plan for health centers, and has been instrumental in forwarding the building program.

As the district program has developed, there are becoming increasingly clear certain issues which are presented in this discussion in the light of New York's experience, but which we believe are pertinent to any program of district administration in a large city.

Long Distance Planning and Integration—An effective district program in a city requires the welding into a coördinated program of all the health and welfare activities of the community. To accomplish this there must be long-distance coöperative planning by both the official and voluntary agencies, so that the program, while remaining flexible, may still proceed in a logical manner and not be haphazard or governed primarily by expediency. To accomplish this in New York City, the Committee on Neighborhood Health Development was organized in 1929. This committee, with Dr. Wynne, then Commissioner of Health, as Chairman, and with a permanent director, was composed of the leaders in voluntary and official work in this field in New York City. Under its leadership, a program was formulated for 30 health districts; boundaries were established, not only suited to local demography and activities, but based on permanent census tracts, so that the population data and vital statistics were made available for each area. All pertinent economic, social, and health data are carried currently for each of the 30 districts as a basis for program planning. Further, realizing that even a health center district, with its unit of approximately 200,000 population, may conceal a wide range of health and social conditions of which the District

Health Officer must be aware in order to work effectively, the committee carries currently for the organized districts all health and related data by smaller units, known as "health areas," each with about 25,000 population. This painstaking groundwork is reflected in the intelligent understanding and support of the program by the agencies of the community. Each district, as it is organized, has its own general advisory and medical advisory committees, which function as subcommittees of the Committee on Neighborhood Health Development.

Scope of Localized Services—In establishing a district health program, careful consideration must be given to how far it is practical to go in decentralization and what types of service best lend themselves to this plan. It was decided that for the present in New York City the scope of the district program should be limited to those services which are most clearly related to the people, with emphasis on preventive medicine and health education. The services at present localized include: nursing (including home visiting for contagion); maternity and child hygiene (prenatal, infant, and preschool); school hygiene (school medical inspection, dental, eye, cardiac); tuberculosis; venereal disease; and health education. These function under a local administrative unit, which includes district records and statistics. This leaves the following services which it is believed can for the present be more effectively administered on a city-wide or borough basis: food and drugs; sanitation; laboratories; vital statistics; and the control of communicable diseases.

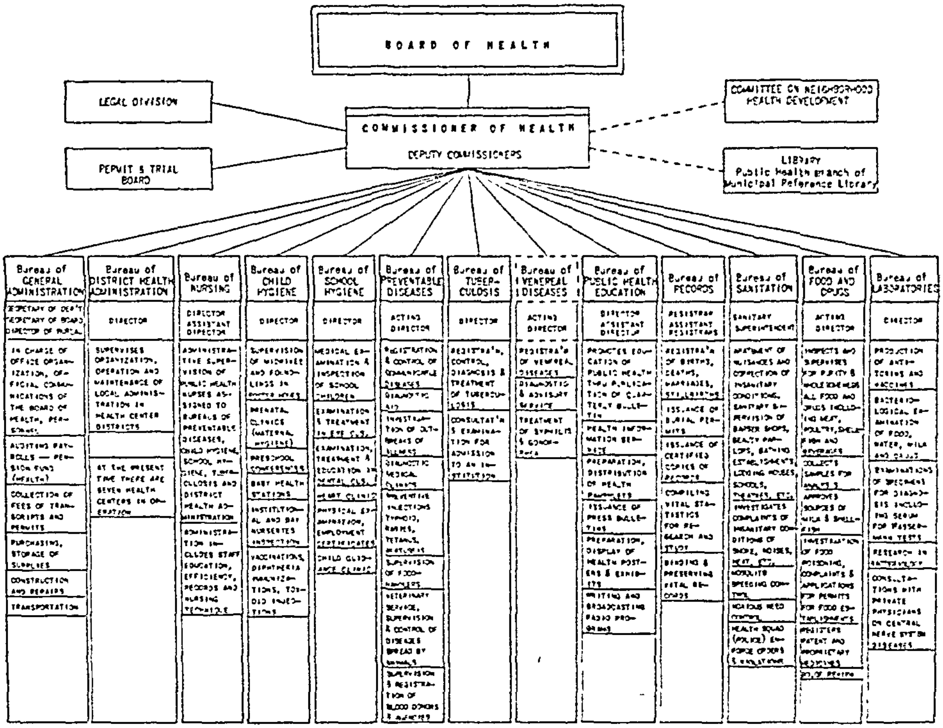
Reporting of contagion is most easily done on a borough basis, since the borough boundaries are more familiar to most people than are those of the individual health districts. The control of communicable diseases also carries with it a certain amount of police authority. It would seem wise for this to remain, for the present at least, vested in the more impersonal central office. Epidemiology is still being developed and therefore remains a central office function for the present.

Administrative Relationships within the Department—The change from a centralized bureau control, either direct to the field staff or through a borough representative, to the localized administrative responsibility of a District Health Officer, for a program which includes the activities of many bureaus, is fundamental and complex. A tentative organization scheme has been worked out and adopted until experience shall point further changes (Figures I and II—Organization Chart).

The administration of public health work in New York City is the responsibility of the Department of Health, directed by a Commissioner of Health. Details of services are delegated to deputy commissioners of health and to directors of bureaus organized for the conduct of special activities. The Director of the Bureau of District Health Administration reports directly to the Commissioner and is in immediate supervision of the district health officers. All policies are determined by the respective bureau directors, subject to the approval of the Commissioner. It is then the responsibility of the district health officer to administer these policies in his district. The district health officer may not change a policy, but it is his responsibility to evaluate policies in the light of their effectiveness in his district and suggest changes which seem wise. Since the health officer is primarily an administrator and not a specialist in the various services, it is considered best for technical supervision to come directly from the bureau concerned to the field staff. Thus the quality of technical work, training of personnel,

FIGURE I

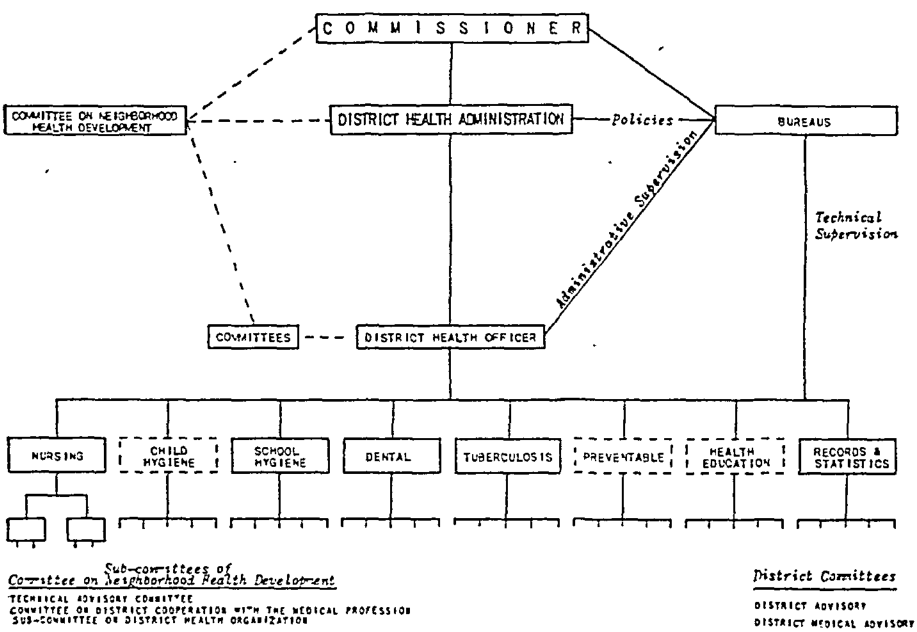
ORGANIZATION OF THE NEW YORK CITY DEPARTMENT OF HEALTH



OCTOBER, 1935

FIGURE II

ORGANIZATION CHART
DISTRICT HEALTH ADMINISTRATION, 1935
Department of Health, City of New York



and professional standards for any special activity remain the responsibility of the director of that bureau.

The persons in charge of functional services within a district, such as tuberculosis, child hygiene, school hygiene, dental service, and nursing, are associates of the health officer and are responsible to him for the administrative detail of their work. They direct the assistant staff personnel in their functional fields. The district supervising nurse acts also as the assistant to the health officer and in his absence assumes charge of the district health office.

Community Organization — To be productive, a district health program must have the whole hearted support of its community. The medical and dental professions, the voluntary health and welfare agencies, and the civic organizations contribute substantially to the success of the venture.

In the New York City plan, it is the responsibility of the district health officer to give leadership toward such a coördinated community health program, and to furnish the secretariat for the district committees. One of these consists of 10 or 15 private physicians of the district, who serve in an advisory capacity regarding medical policies and program. These physicians are recommended by the County Medical Society and appointed by the Commissioner. They not only advise with the health officer, but are most useful in interpreting the work of the health district to the physicians of the community. Another general advisory committee consists of local representatives in the fields of health and welfare. This group considers how best to coördinate the departmental and voluntary work in the area, and also interprets the work of the health district to the other agencies of the community. The health

FIGURE III

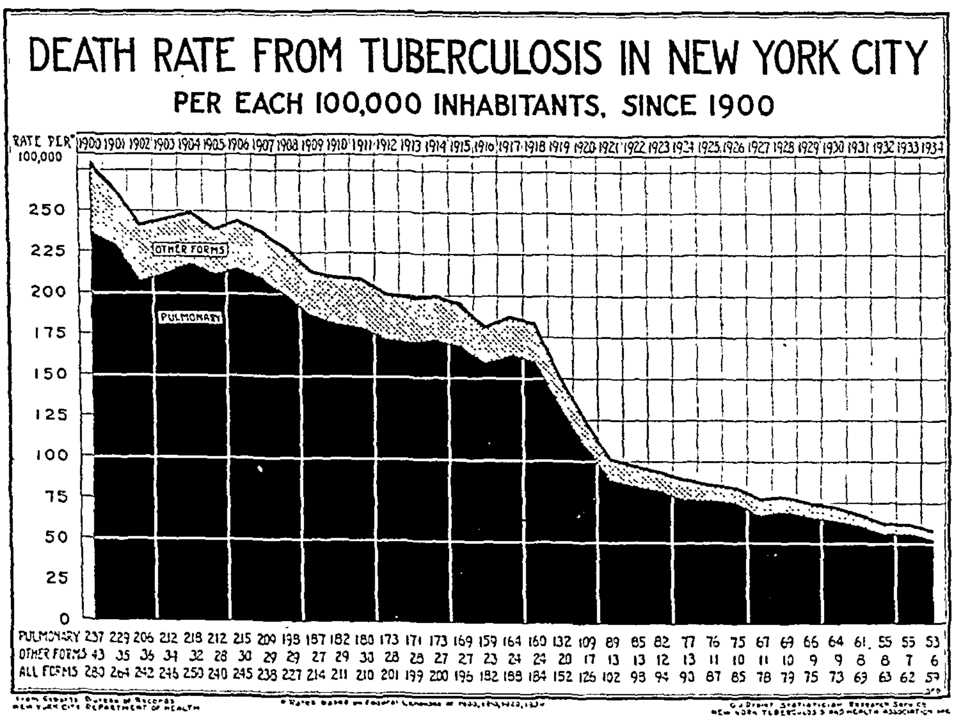
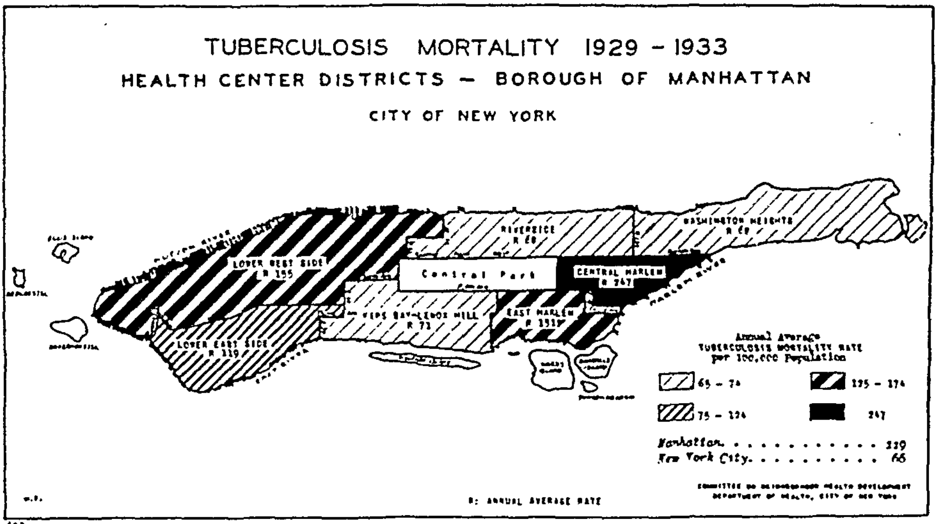


FIGURE IV



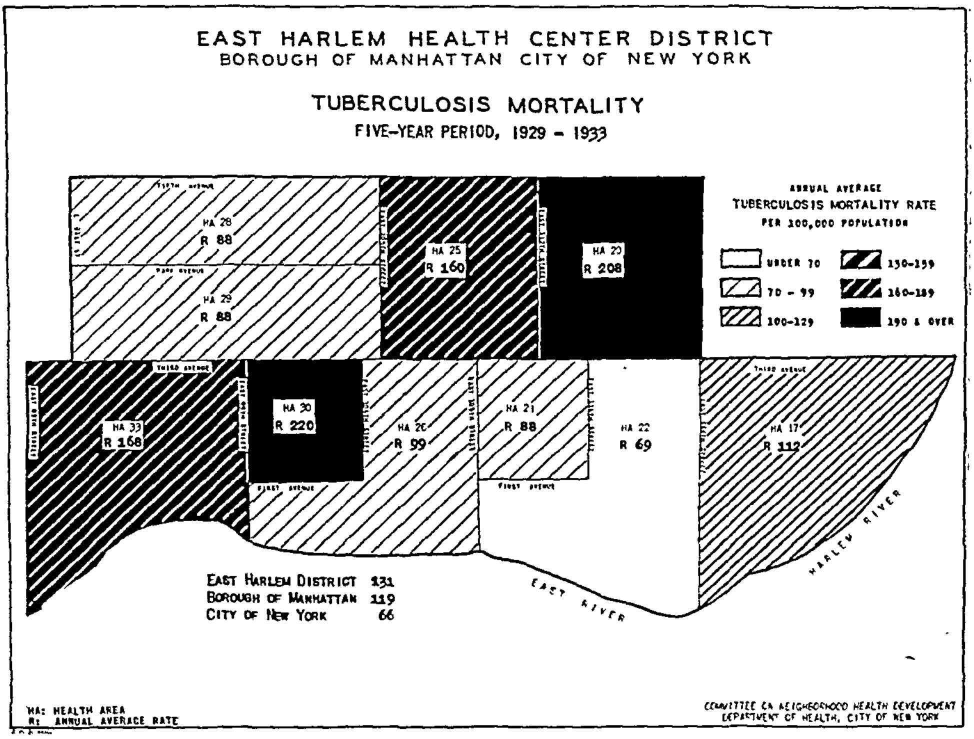
officer takes an active interest in the plans of other agencies by serving on their committees and giving both formal and informal talks to many local groups.

District Statistics and Records—One of the important parts of district work is the analysis of health needs, resources, and work by local areas within the district. Only in this way can the so-called sore spots be detected and work emphasized at those points. The tuberculosis work illustrates this. New York City may well be proud of its steadily declining rates for tuberculosis mortality and morbidity (Figure III—Tuberculosis Mortality Rate—New York City, 1900–1934). However, when these data are broken up by districts, it becomes apparent that the decline is not uniform throughout the city. For example, the tuberculosis mortality rate for the city as a whole, for the period 1929–1933, was 69 per 100,000 population; but, for 3 health districts, was very much higher (Figure IV—Tuberculosis Mortality, 1929–1933, Borough of Manhattan). During this period, the tuberculosis mortality rates were 247 in Central Harlem, 155 in Lower West Side, and 131 in East Harlem. Furthermore, if one of these districts (for example, East Harlem) is further subdivided into its component health areas (Figure V—Tuberculosis Mortality, 1929–1933, East Harlem District), it will be seen that the rate varies from 69 in Health Area 22, where the East Harlem Health Center demonstration has been carried on for the past 14 years, to 208 and 220 in Health Areas 20 and 30 respectively. It is in these latter areas that intensive work in this district is needed. It is also of interest that these areas have the largest proportion of Negro and Puerto Rican population in the district (approximately 28 per cent) and are of the lowest economic level.

Current health data and analysis of services are kept by health areas and health districts as the basis of program planning.

Health Education—As the health officer becomes familiar with his district, the necessity for methods of health education which will meet local needs and be productive of results in a given section becomes apparent.

FIGURE V



Health education, perhaps more than any other service, is effective only as it is adapted to local circumstances. The health officer, with the assistance of the Bureau of Health Education, and in coöperation with the agencies in his district, builds his health education program around the needs and resources of his community.

Opportunities for Research and Demonstration—There is always need for new administrative procedures and technics. In a large city it is much easier if such experiments can be first tried out in a fairly small population group.

If successful, the procedure may, after thorough trial and, often, changes based on experience, be instituted throughout the city. If, on the other hand, the venture proves unsuccessful, it is comparatively easy to discard it without disturbing too many people. Health districts in New York City have been found well adapted to this type of experiment and administrative research. Such services as the Consultation Chest Service for private physicians, the pneumothorax refill service, preschool conferences, record forms, and health education methods have all been tried first in a health district and then adopted as a policy for the rest of the city.

Need for Trained Personnel—One of the outstanding needs in district work is trained personnel. The district program will succeed or fail largely in proportion to the personality and capability of the district health officer and his staff. The program in New York City calls for the administration of health activities in each district by a full-time district health officer, whose responsibility it will be to know intimately the needs, resources, and opportunities of his district, to adapt the official program to meet those needs, and to give leadership to a coördinated program for community health in which

the interests of the department, the private practitioners of medicine and dentistry, and all health and welfare agencies will be welded. To fill such a position successfully, the health officer must have not only a sound medical background but, in addition, the viewpoint of a public health administrator. This requires experience and training in the broad field of public health. It is almost equally important that those associates of the health officer who are in charge of functional services within a district should have this public health and administrative viewpoint, rather than the strictly clinical interest which is more often found. Here and there among the professional group, one finds increasing numbers of individuals who have an interest in public health and executive work and who, as possibilities in the field open up, are eager to secure further training to fit them for this type of work. How to make public health training available for this group, and how to stimulate a better understanding of public health objectives among the professional groups in general, are questions of vital interest.

An important part of the New York City plan is the use of at least several of the health districts as training centers—for postgraduate study in public health; for the further training of the department staff in special services; and for the training in public health objectives and viewpoint of undergraduate medical students.

SUMMARY

Experience is pointing the way toward district health work as an administrative technic which will enable large cities to render their health services more effective by bringing them closer to the people. After study and experimentation along these lines since 1929, New York City officially launched its program of district health administration in 1934. Based on the experience of New York City, the issues which seem most important for the success of such a program are:

Long distance planning and the integration of the official program with all health and welfare activities in a district

Careful consideration and definition of the scope of the district services

A working out of relationships between the central organization and the districts, which shall preserve the necessary functions of formulation of policies and responsibility for the technical quality of special services by the bureaus, and place upon the health officer the responsibility of administering the departmental program in his district

The organization of a district for community interest and health planning

The importance of health education, and the adaptation of methods to suit an individual district

The use of districts to try out new administrative methods

The development of staff with public health viewpoint and training

Health Security*

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IT is in the research laboratory that great events in medicine and public health usually are born. Just two weeks ago, however, there occurred in Washington one of the most significant events in the history of public health in this nation when President Roosevelt signed a bill appropriating money to launch the Social Security program.

Most people think of social security in terms of unemployment insurance and old age pensions, yet the law includes provisions through which, for the first time, we get a start on a national program to protect and promote the health of the people.

This is entirely appropriate, for the destitution arising from sickness or death of the wage earner is a prime factor among those circumstances which contribute to the insecurity of people. Yet much of this is preventable, as you have observed in your tuberculosis work where children become dependent and delinquent as the direct result of the death of a parent. Any national effort, therefore, to promote social security must include a serious attempt to prevent unnecessary disease and death.

The Social Security Act authorizes 10 million dollars to the U. S. Public Health Service, of which 2 million is for research to develop improved methods of disease control. Eight million will be allotted to the states for public health work, allotments being made on the basis of population, special health problems, and the financial needs of the states.

The Act also authorizes nearly 7 million dollars to the U. S. Children's Bureau for the health of mothers and children and for the care of crippled children. Grants from these funds are made on the basis of the number of live births in each state, the number of crippled children, the health needs and the financial status of the state, preference being given to the needs of rural areas. In general, it is contemplated that state and local appropriations will match the federal funds and that proper standards of service will be required for a cooperative attack upon those conditions which undermine the health of the people and contribute to insecurity.

Though it falls short of the millenium the good health officer longs for, this program reasonably may be expected to advance the health of this country to new and higher levels. Moreover, as in the past, a good and useful act frequently is useful far beyond its occasion. For example, when Sir Humphrey Davy in 1810 first discovered a greenish-yellow gas which he called chlorine, little did he dream that through its use today in sterilizing 85 per cent of the public water supplies in this country, typhoid fever would become a rare disease. Further, this same chlorine was used to cure wounds in the World War, and it bleached the

* Read before the New York Tuberculosis and Health Association, in New York, N. Y., February 25, 1936.

paper on which my remarks are typed.

Neither was the new order in public health, which has resulted from their charitable endeavors, foreseen by the founders of the State Charities Aid Association and the Charity Organization Society, through which the tuberculosis and public health movement of our state and city have come into being. These fine citizens saw misery about them. They sought to relieve it. As they inquired further into its causes, they were appalled to discover how vast and how vicious was the part played by tuberculosis. The term social security had not been coined; but in order to reduce the number of children made orphans and the number of families needing alms because of the illness or death of the wage earner, the group set out to fight tuberculosis. Then, as now, there was no specific either for prevention or cure of the disease; so education was used as a weapon against it. Through skillful political organization, the Legislature was induced to provide for the institutional care of patients. Indeed the "charity lobby" as it is known at Albany, led by Homer Folks, that devoted champion of the downtrodden and the sick, through more than 30 years, session by session, has built up a powerful body of supporters not only for tuberculosis work but for all good public health measures.

This citizen fight against tuberculosis, which you started, had a significance far beyond the 65 per cent reduction in deaths from tuberculosis, great as that accomplishment has been. Its greatest significance lay in the demonstration of a new weapon for use against *all* preventable disease—the fact that scientific knowledge of disease *could* be interpreted to the people; that public health action could be organized as a result of this education; and that an enlightened citizenship was of more value than quarantine laws in disease control. Before that time public health effort had been largely restrictive, legalistic, concerned primarily with the cleaning up of filth and the use of police powers by health officers. You made possible a new bi-partisan partnership of the people and their governmental agencies, state and local, which has been more valuable in reducing the incidence of tuberculosis than all the police powers of health officers ever on the statute books.

It seems clear, then, that from the efforts of just such groups as yours there has arisen in the American mind the desire not only to relieve misery due to sickness, death, and destitution, but also wherever and however possible, to ward it off entirely. This is not a transitory emotion born in the panic of economic disaster. Its roots go deep. As Sir Arthur Newsholme has said, "We all agree that no civilized community is justified in permitting any of its members to suffer, much less to die, for lack of food, clothing, shelter, or medical aid when sick. This obligation is everywhere acknowledged, both in America and Great Britain, however imperfectly it is met." What Sir Arthur elsewhere calls the "growth in the sentiment against suffering," expressed in your movement beginning a generation ago, was the first step in the modern method of meeting this obligation of a "civilized community." In the years since the beginning of your movement we have come into an economic life permanently altered from a self-sufficient rural and agrarian system into an interdependent urban, industrial system. In addition, education has become more general and medical science has advanced tremendously. The whole composite is a people not only in need of good public health service but a people who are increasingly aware that through good health there is available a large degree of that security which is their deep desire.

Since a population increasingly aware of its needs tends to require an increasing amount of health service at public expense, there are those who look upon this manifestation of representative government as an unreasonable burden upon the tax payer and an unwarranted interference with the right of the individual to be sick if he wishes. Chief Justice Hughes, who, as Governor of New York, sponsored actively the first tuberculosis control movement, has said:

> The settlement and consequent contraction of our landed domain, the pressure of a constantly increasing density of population, the interrelation of the activities of our people, and the complexity of our economic interests have inevitably led to *an increased use of the organization of society in order to protect the very bases of individual opportunity.*

Note that, " in order to protect the very bases of individual opportunity." According to the Chief Justice, then, and many of us feel that your work here in New York has been a first class demonstration of the theory, one must use social legislation in order to protect and advance individualism.

It matters little what party may be in power or what may be the current political slogan, the public when awakened to the saving of life and relief from suffering which is possible, will continue to provide for itself an increasing amount of tuberculosis and other health service as one means of security. Fortunately the cost is well within our ability to pay, as has been the cost of our campaigns against tuberculosis itself, against diphtheria, which your organization has sponsored since 1926, against typhoid, against yellow fever, against smallpox. In fact, it is far more economical of the public funds to prosecute such campaigns than to neglect them.

Do not hope for too much from the health measures which can be carried out under the present Social Security Act. They are only the first feeble steps of a people who at last are beginning to realize what they need. In public health work we stand today just about where we were in public education in the middle of the last century. I hope that in our attempt to provide good health for everyone we may avoid some of the blunders which characterized our effort to make an education available for all, through measures more generous than they were discriminating. If we do avoid such blunders, it will be largely the responsibility of people like yourselves who have been a generation ahead in your thinking about public health. You fathered the security movement originally, for you fostered the hope that for poor as well as rich, health and a healthful heritage were available, if good citizens would organize to provide them. New York has done well, though even here we barely have scratched the surface of what is possible in health protection. In many other states it seems apparent that not even the surface will be scratched without the stimulation, leadership, and help of a long-range, soundly planned national health program which it is possible to initiate under the Social Security law. I trust that you, as individuals and as an organization will guide, encourage, warn, and counsel the makers of that program, for it is built on the foundation stones you laid.

From my own point of view, it seems probable that effective health security can be achieved only through the extension of the New York method into the states where it does not now exist: which is a bi-partisan partnership of the people and the health agencies of government, state and local. In particular, I hope that you will make yourselves felt through such partnership in the prevention of three evils which may threaten the working out of social security. These evils, as I see them, are:

first, that because of our lack of vision and of experience and of health organization in many states, some funds may be spent for purposes of secondary importance; second, that in a few places, short-sighted authorities may look upon the relatively small federal grants of about 10 cents per capita as a means of relieving local budgets rather than as an opportunity of doing needed work; and third, that sometimes it may be forgotten that disease and death are non-partisan and that we may fail to place the right health official in the place because he is of the wrong political faith.

In my simple philosophy, the greatest need for health action is where the greatest saving of life and suffering can be made. I shall mention a few of the more obvious opportunities where experience has proved that the investment of public funds and citizen interest will bring a large return.

First, I would place the necessity for finishing the job in tuberculosis. The tremendous decline in the disease in this state from a death rate of 173 per 100,000 in 1905 to less than 50 in 1935, should not obscure the fact that it is still the leading cause of death in the age group between 20 and 40. Up to now we have talked and hoped for partial control. One of the most conservative of our public health authorities, Dr. Wade H. Frost of Johns Hopkins University, in a recent article advances convincing arguments that we can now begin to think about the eradication of tuberculosis. Only two factors, he says, bar this possibility. One is that in years to come the tuberculosis germ may become more virulent; the other is that we as a people may become less resistant to it. Neither contingency seems probable to him.

It is interesting to observe that a conservative scientific statement of today surpasses the most enthusiastic hopes of the last generation. Moreover, in working toward the goal of eradication, we know just where to focus our attack:

Upon first, the young woman in industry or the young mother,

Next, the worker in the dusty trades which form the background for many an unpublicized "Gauley Bridge" disaster,

Also, the Negro, the members of certain other racial groups,

And last, the man or woman who is ignorant, poorly fed and badly housed.

It is a great day for public health when we can anticipate the conquering of tuberculosis against which we have made progress. But an even greater opportunity exists for the eradication of syphilis against which we have made no progress, though its end results crowd our jails, our poorhouses, and our insane asylums. Yet there are specific methods of controlling it which are better authenticated by science than the means of controlling tuberculosis. Sweden and Denmark are two countries which have shown us how to do the job and we are well launched in a serious effort against syphilis in New York State and City.

Deaths from cancer are increasing and stand second among all causes. Yet at least 20 per cent of them could be prevented if cases could be recognized early, and if we had everywhere the facilities for proper diagnosis and treatment.

Deaths among children under 5 years of age have declined from 30 per cent to 8 per cent of the total since this organization was started, but the mortality rates of mothers in childbirth, and among babies in the first month of life, are still disgracefully high; although authorities agree that well placed effort, using proven methods, could within a few years reduce them to one-half the present level.

In addition, more children and adults alike suffer from faulty nutrition than from any other form of physical impairment except dental defects, which is one result of an improper diet. Yet

we do little but talk about correcting these conditions. It is high time we act; for our present knowledge of nutrition, as was forcefully stated at the last meeting of the American Medical Association by its president, Dr. J. W. McLester, shows definitely that the future of the race will depend upon the food we eat, to a greater degree than in the past we have profited by control of the communicable diseases.

Little is done in many of the states to restore crippled children to lives of usefulness, although New York and a few others have shown the way that much is possible. The Social Security plan to organize, assist, and raise standards of this work on a nation-wide basis is not only humanitarian but soundly economical.

In short, in each of the instances I have mentioned where the saving of life and the relief of suffering have been scientifically demonstrated to wait only upon organized effort, our national picture shows a great unevenness of performance which ranges from nothing at all to the good beginning—but not by any manner of means the full execution—of New York and some of her sister states. The first task, then, to be accomplished in a program for health security, would seem to be the leveling up of present services. The means of doing this are simple and include, first, the provision of the necessary human machinery. We need, and do not have, in every city and county, or comparable area, a well trained full-time health officer with a sufficient technical staff holding office on the basis of merit, not politics. The second need, is a minimum budget to perform essential tasks with national leadership, plus citizen backing, for the energetic prosecution of those tasks which will best repay, in human as well as financial returns, the expenditure of money and effort. But a leveling up to our present best standards alone will not achieve health security for us. The whole population, employed and unemployed alike, needs a better distribution of good medical and nursing care. For those who are destitute, all necessities of life including medical care must be provided. For the half of the population which even in the prosperous 20's had an income too small to provide for itself all necessary medical services, public funds must supplement individual effort.

There are several ways of doing this. It might be done through health insurance which would increase the availability of medical service and distribute the cost. Another proposal is State medicine which would make medical care available on the same basis as public education. A third possibility, the one toward which I myself incline, would require liberalizing of the present medical practice and coördinating it with public health and medical services. This would assist the private physician by providing for him laboratory, hospital, nursing, and other facilities for the treatment of his cases, and would relieve part of the load of catastrophic and chronic illness from the low income group. Whichever of these plans is adopted, or whatever modification of any of them, the fact remains that it must be possible for the whole population to secure medical care if we are to attain any semblance of health security.

Pneumonia, with its 12,000 deaths last year in New York State, is an example of a disease which can be fought successfully by coöperation between public health official and private physician. In the campaign now under way to reduce deaths from this cause, under the joint direction of the Medical Society of the State of New York, the State Department of Health, and the State Association of Public Health Laboratories, facilities for the best treatment of pneumonia are put into

the hands of every up-state physician; free laboratory tests are made to determine the type of pneumonia; and a new, better, concentrated serum, costing at retail from $20 to $100 per patient, is supplied without charge, by the State Department of Health to any physician who asks it. In addition, the State Department of Health, through its own staff of regular and W.P.A. nurses and in coöperation with the visiting nurse associations of up-state cities, volunteers to supply needed nursing service to all patients, not hospitalized. The State Medical Society volunteers to give its own members up-to-date postgraduate training in the management of pneumonia, under the direction of skilled pneumonia specialists. All agencies plan to work together for public education.

This is as yet a new venture. Its various factors are not yet in complete and perfect alignment. Nevertheless it is significant, both as an example of how public and professional agencies can work effectively together toward a public health end, and, concretely, how the private practice of medicine can be supplemented by better public facilities —in this case, laboratory, nursing, and serological service. It is too early to forecast definitely what the results will be, but conservative estimates indicate that a few years of continuous and concerted effort will cut down the deaths from pneumonia by at least one-fourth.

Nevertheless, when all these things have been done; after we have leveled up our present public health services and prevented much existing disease, and after we have provided good medical, nursing, and dental care for less easily preventable disease, we still need to control the unhealthful factors in the environment. Sanitary housing in England, and in many continental countries is considered a direct public health responsibility. Here we seem strangely oblivious to anything except its job-making possibilities. Food of the kind and quality for good nutrition is more important than clinics for the undernourished; yet we have made the most casual attempts to improve the diet of the millions fed at public expense and no more than a gesture at improving the food habits of the rest of the population. To provide these and other factors in a healthful environment requires a job at a fair wage. We should, by now, have learned that it is better judgment to provide useful work for the unemployed, than to continue, through insistence on the cheapest possible dole, to add continuously to the ranks of the physically and mentally unemployable. I emphasize the word "useful." Frequently we have failed to provide useful work because that requires planning, and there seems to be here and there the idea among partisans that it is somehow un-American to do planning for the public benefit. However, the continuing good health record of the people in this state which, during this past year surpassed all previous records, has resulted directly from our relief and unemployment methods—faulty as they are—no less than from the direct application of medical science to disease problems.

Though I have warned you not to hope for too much from the health program possible under the Social Security Act, I think that most of us are heartened by the fact that at long last this beginning is being made. Just as a generation ago the founders of your organization broke through the apathy of state and city toward tuberculosis, which caused so much needless suffering and destitution, so today we feel that we have cracked the crust of national indifference to public health as a function of government.

In behalf of your cause you have waged war in the state and city against the unscrupulous, the ignorant, and the self-seeking. I know, therefore, that

you will understand the necessity of caution in the working out of the national health program—the effort that will be required to avoid potential evils arising from lack of experience, lack of vision, and the tendency to partisanship. It is my hope that through this and through your national organization your influence may be felt for sound policy.

Whether you agree with me or not in the detail of health action which should be initiated, will you exert to the fullest your prerogatives as citizen-partners and consider ways and means of attaining, here and elsewhere, the three objectives with which I feel confident, and will agree in intent?

First, how may we level up our existing health services? And remember this means the wards and boroughs of New York City, cities and counties of New York State, as well as the backward and the progressive states. For in this way only shall we be able to lift the load of preventable disease.

Second, how may we re-distribute medical, dental, and nursing care? Half the population is unable to obtain sufficient care for themselves. Half the professional population has neither a living income nor a full-time task. Whether you like my way or another, some way must be found.

And third, how may we control the health factors in the environment—housing, food, work and working conditions, a living wage? For surely it seems an unscientific use of our effort and an unbusinesslike failure to order our affairs, when we struggle to control and to cure disease that could be prevented at the source.

These several considerations belong to the whole challenging field of health security in which, as you yourselves have demonstrated, citizen interest is equal if not superior to that of the health official. But in conclusion, let me remind you of our joint, special interest in health security, which requires an addition to your time-honored slogan. Let it now read: Tuberculosis is preventable; tuberculosis is curable; tuberculosis can be wiped out in our state and nation!

"In a plea for putting science and simplicity first, and dress suits and $5 dinners and keeping up with the Joneses last, one does not forget that formal papers and striking operations are not all that count at meetings. One close personal contact, one incidental idea from new research under way, one informal talk within the little group in one's own particular field—all these foci of scientific infection are often worth all the rest of the show put together. Friendships and relaxations—even golf—are grand parts of annual meetings."—Robert L. Dickinson, M.D., *J.A.M.A.*

Authoritative Standards and Association Policy*

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THE immediate occasion for this discussion is some correspondence with several members of this Board concerning the Report on Educational Qualifications of Health Officers which was adopted last May by the Committee on Professional Education, distributed in September to members of the Governing Council and subsequently withdrawn. However, this report comes into the discussion only incidentally as a concrete example illustrating the two principal points which I wish to present for the consideration of this Board. These are: first, that the future policy and character of the Association are likely to be determined in large measure by the cumulative total of actions taken with respect to the establishment and maintenance of authoritative standards of procedure in certain fields of interest, as represented especially by professional education and administrative practice; second, that the questions of policy involved in these decisions receive very limited discussion in the Association at large.

The purpose of the Association is clearly defined in its Constitution. It is " to protect and promote public and personal health." The activities to this end, for which the Constitution specifically provides, are well summarized by Abel Wolman in his first report (1930) as Chairman of the Committee on Research and Standards.[1] In the introduction to this report, Mr. Wolman says:

> A member of an association of national scope may justly expect it to perform for him two major functions. It should provide for him an opportunity to exchange information with fellow workers, and should formulate standards of measurement in those fields where a uniform procedure would facilitate efficient action.

This statement, as worded, is not all-inclusive, but it indicates the line of cleavage along which the activities of this Association may be cleanly divided into two fields, both devoted to the same ultimate objective, the promotion of health, but quite distinct in immediate purpose and method.

On one side are activities, represented by the Section meetings and publications in the *Journal,* which are concerned with the constant introduction and discussion of new facts, new ideas and new procedures. The immediate purpose and effect of these activities is to keep up a continuous forward movement of knowledge, opinion and practice. For this forward movement the motive power is diversity of experience and opinion, freely expressed by individuals, speaking each for himself alone. Each new observation, opinion, or procedure thus presented gives an impulse to mass

* A statement presented at the meeting of the Executive Board of the American Public Health Association, New York, N. Y., December 19, 1935.

opinion, and the critical discussion which ensues tends automatically to correct error and to insure that the net movement will be in the right direction.

On the other side are those organized activities concerned with gathering up and formulating such agreement as has developed in the forum of free discussion. Whether the particular undertaking be the formulation of standards or the expression of agreement in some other form; this, as an organized activity, is characteristically the work of committees, speaking more or less explicitly in the name of the whole Association or one of its Sections.

These two activities of the Association, to foster diversity of opinion as the essential means to progress, and to formulate agreement as the basis for concerted action, are opposite in direction; and the main problem of Association policy is to keep them so balanced that neither will interfere with the other. To maintain this balance requires a just appraisal of the mutual relations and relative importance of the two functions.

The purpose of this Association is not merely to advance knowledge pertaining to health, but to apply it to the best effect; and to the extent that achievement of this purpose really requires explicit formulation of agreement, this function should be given precedence. But it is not often that *explicit formulation* of agreement and its expression as the authoritative opinion of the Association is really necessary—for effective agreement does not usually need to be stated in explicit terms. It develops naturally from discussion, in organized Section meetings, in the *Journal*, and in the informal contacts between individuals which lead to franker exchange of ideas and to mutual acquaintance, toleration, and respect. It is chiefly in this way that important principles and procedures for promotion of public health come to be generally accepted and applied, not at any given time, by everybody at once, but gradually, as the weight of evidence accumulates and makes itself felt by larger and larger numbers of those who are directly responsible for practical application. As compared with the sum total of *unformulated* agreement which is thus spontaneously developed out of free discussion, and year by year is translated into action, that which needs to be formulated in definite terms and expressed as authoritative opinion is relatively insignificant. Since it is, moreover, quite obvious that there can be no agreement of any value except such as is developed from adequate discussion, I believe it will not be questioned that to maintain a free interchange of information and opinion among its members is the first and most essential business of the Association. There is no danger whatsoever that this function will be over-developed or abused.

On the other hand, there is real and constant danger that the opposite function of formulating agreement and expressing it as authoritative opinion will be excessively developed. The essential danger inherent in authoritative pronouncements is that they purport to express substantially unanimous agreement based upon adequate evidence, and that they attempt to stabilize practice by throwing the influence of the Association against dissent. There are, within the field of public health, many principles of action, capable of simple expression, which are so firmly established that this Association can well afford to endorse them when any useful purpose is served thereby. But the urge for authoritative pronouncements does not stop within these limits; it extends to questions of a quite different character, scientific questions on which the evidence may be impressive but not conclusive, matters of procedure which

are not fundamental. With respect to such questions authoritative pronouncements purporting to express the opinion of a scientific body such as this Association are dangerous, even though they may be acceptable to a majority of the members, for if they fail to indicate the dissent as well as the agreement, they are misleading; and however much the intent may be disclaimed, the effect is, in some measure, to restrict the freedom of discussion which is the most essential function of the Association.

Perhaps the most frequent occasion for the expression of authoritative opinion by the Association as a whole or by one of its Sections, is in connection with the formulation and promulgation of standards. This is a recognized and useful function of technical scientific bodies; and Mr. Wolman, in the passage quoted, has properly included it among the important services which this Association ought to render to its members. He has, however, indicated the limits within which exercise of this function should be held, when he refers to "standards of *measurement* in those fields where a *uniform procedure* would facilitate *efficient* action." These are essential limiting conditions, that the measurement proposed should be valid, and that the uniformity established should be truly beneficial. Where these limits are accurately perceived and carefully regarded, standardization of procedure is appropriate and useful; where they are overlooked it becomes dangerous.

There are, of course, many activities within the field of interest of this Association, in which uniformity of procedure is a paramount consideration, and where valid measurement, at least in a relative sense, is entirely practicable. For the promotion of such activities, it becomes more or less imperative to adopt some uniform procedure. This may be said, for instance, of methods for determining and expressing the potency of biological products, for routine chemical and bacteriological examinations of water and sewage, for the classification of causes of death, and for presentation of basic tables of vital statistics. In some of these procedures the maintenance of uniformity may even be of such importance as to make it inadvisable to exchange an established method for one which is more exact or convenient.

There are, however, very many other procedures in which uniformity is not desirable, or a valid measurement not practicable. For instance, it is desirable and practicable to establish a standard measurement for potency of diphtheria antitoxin, but neither practicable nor desirable to establish a standard method of using it in the treatment of diphtheria; it is better to leave this to well developed individual judgment.

It is also necessary to consider whether standardization which may be justifiable for some other agency is appropriate to this body. For example, it is significant that this Association, which has concerned itself with establishing standard methods for the bacteriological examination of water, has not undertaken to establish standards for their interpretation with respect to safety; it has left this to an official body, the U. S. Public Health Service, which is responsible for the enforcement of regulations and under some necessity of establishing a more or less uniform basis therefor.

It is generally true that in proportion as procedures become more complex, requiring the consideration of many variables, some of which are not capable of exact measurement or quantitative expression, the principle of standardization becomes less and less applicable, and its promotion more and more in conflict with the broader purposes of this Association. Very many essential

procedures are of this character in the fields of professional education and administrative practice. That the promotion of standard practices in such fields is subject to legitimate objections and attended with real danger is generally recognized. It is attested, for instance, by the reports of two committees, both *advocating* the extension of standardization into new fields.

The Committee on Administrative Practice, in submitting the first *Appraisal Form for City Health Work,* says [2]:

> The committee has approved the official publication of an *Appraisal Form* only after long consideration and much discussion. Certain members of the committee seriously doubt the advisability at this time of setting up any formal standard of performance in health service. Certain others have felt that there is at present *no adequate scientific basis* for an attempt to formulate any numerical expression of the relative value of various health activities. A majority of the committee, however, have felt that the proven utility of the method more than outweighs its *inherent inaccuracies* and disadvantages, and have approved the schedule with the hope that in the next 3 years experience and study will permit the further perfection of the schedule and the *establishment of methods of evaluation* which will obviate the objections which have been offered to the present plan.

The Sub-committee on the Review of Standards, in its report (April, 1934) to the Committee on Research and Standards, advocating a comprehensive plan for the development of standards, says [3]:

> We are not unmindful of the *dangers inherent* in such a program as we propose. Standards may make for *rigidity* where there should be flexibility; standards *may make permanent that which should be transient.* We assume, however, that every procedure which may be developed to give impetus to the development of standards will be accompanied by a procedure for periodic review and revision. If this safeguard is established *pari passu* with each mechanism for the development of standards, we are confident that there need be *no greater danger* in a larger sphere of activity than has been evidenced in the smaller area which the Association has already cultivated.

The disadvantages which are specifically mentioned here—which the committee, in each instance, considers are outweighed by counterbalancing advantages—are those which are implied in Mr. Wolman's statement of limitations, namely, that the measurements proposed are inherently inaccurate, and that standardization may tend to establish a static uniformity instead of a forward-moving diversity of practice. The danger to the Association is that advocacy of a measurement which is not valid impairs its scientific prestige, and that any effort to stabilize practice comes into direct conflict with the Association's main function of moving opinion and practice constantly forward by the interchange of diverse opinion and experience.

These are grave dangers. If they are disregarded or too greatly discounted in the proposals which come up from year to year for establishment of more and more standard procedures, the inevitable result, over a period of years, must be to change the character of the Association from that of a scientific body, interested in promoting discovery and invention to that of an authoritative body standing in defense of its established special doctrine.

The extent to which a single decision in this field may influence the whole policy of the Association is illustrated by the Report on Educational Qualifications of Health Officers, presented by the Committee on Professional Education.* Assuming that the content of the report is well known, I will note only briefly its general import. It specifies in detail the content of an

* This report, after having been circulated to the members of the Governing Council and Fellows of the Health Officers Section, was withdrawn for further consideration by the committee. Hence, its specific recommendations are no longer before the Association; but, in one form or another, the general questions of policy which are raised in the report must eventually be decided by the Association.

8 month course of postgraduate instruction, and designates this

> . . . the minimum of special education, beyond that possessed by the average graduate of medicine which *must be had* by a young man entering public health administration in a *subordinate* position, *if he is to teach himself* successfully to carry on the work of a health officer.

It refers to "rigid enforcement" of these "minimum requirements"—by what authority is not specified. It implies that authority should be assumed and exercised to bring about adoption of the particular course which it has outlined by all institutions offering postgraduate courses for prospective health officers; and it raises, but leaves open the question whether universities shall be required to adopt a uniform schedule of hours to be allotted to the various subjects which are included.*

Leaving aside all detailed criticism, and confining attention to the report's broad significance, it is worth while to inquire what acceptance of these recommendations would imply with respect to the policy of the Association as a whole. It would place the Association in the position of advocating and defending not the general principle that health officers should be broadly and suitably educated, but the very different proposition that they should be *uniformly* educated, in accordance with a particular schedule *laid down by a committee of this Association.* The effect of this would be to project the Association into an entirely new set of external relations, placing it in an ill-defined position of assumed authority over the public officials who are responsible for the appointment of health officers and the universities which undertake their special education. These implications, involving a major change in the Association's external relations and policy, are definitely contained within the report. They follow inevitably from the primary assumption on which it is based, namely, that standardization of the educational qualifications of health officers is desirable and is a proper function of this Association. This is the really important recommendation which the committee, presents; in comparison with this, the rest is a matter of relatively unimportant detail. Yet the committee presents this particular recommendation as a matter of course, with no discussion of its validity and no intimation whatsoever that its acceptance by the Association would involve any significant change of basic policy.

It may be that the Association as a whole really wishes thus to alter its traditional policy. It may even be that to do so would be wise—though I cannot think so; but assuredly it is not wise to take action of such consequence without full public discussion, bringing to the attention of the whole Association the full implications as well as the intention of what is proposed.

This brings me to the principal point which I wish to present to the attention and consideration of this Board. It is that, under the existing organization and procedure of the Association, there is almost no informative *public* discussion of the *implications* of "standardization" in precisely those fields where its wisdom is most open to question, namely, in professional edu-

* The exact language of the report on this subject is:

"We do not believe it advisable at this time, if at all, to attempt to set up any definite schedule of hours of courses as a standard which must be adhered to by institutions offering such instruction. Much additional experience is necessary to determine what should be the proper allotment of time in such a course."

In the parallel report by the same committee on Educational Qualifications of Public Health Engineers, the corresponding statement confirms the implication that it is lack of sufficient experience which deters the committee from undertaking to specify the allotment of time. The statement here is:

"It is not advisable to attempt to set up any definite schedule of hours of courses since experience is necessary to determine the proper allotment of time to such courses. This should be left to the educational institutions for the present at least."

cation and administrative practice. In the reports of the committees dealing with these subjects, discussion of this underlying question is either omitted or is limited to the presentation of arguments on the positive side. In certain reports advocating standardization the existence of objections is mentioned, but they are dismissed as of no special consequence; and to the best of my knowledge, serious written discussion of the dangerous implications attending over-wide extension of standardization is not to be found in the public records of the Association of recent years.

In default of definite provision for general and public discussion of this question, as it arises in one form or another from year to year, the whole responsibility for determining the policy of the Association in this, its most precarious field of activity, devolves upon a series of committees—including as "committees" the Executive Board and the Governing Council. In none of these committees are circumstances favorable for really informative discussion which will eventually reach the general membership of the Association. The committee of original reference, whether it be one of the standing committees of the Association or a Section committee, begins its work under instructions which more or less definitely indicate that it is expected to produce a positive rather than a negative report —one recommending specific standards rather than advising against them; and within committees the impulse is naturally toward positive action. Discussion is, therefore, apt to begin with details of proposed standards rather than the underlying question of their justification; and, since it is not customary to present minority reports, any argument against the wisdom of standardization which is made within the committee is not likely to be presented in full to the Association at large or to the governing bodies. When specific proposals come to this Board, and later to the Governing Council, there is little opportunity for informative debate; and, quite properly, the general tendency of these bodies is to approve the reports of responsible committees unless there are strong and definite reasons to the contrary. Any extended discussion unfavorable to the principle must usually be presented as a protest against action which has already been taken by the Association; and while this condition is not prohibitive, it imposes a severe handicap upon the negative side of the debate.

I have no desire to bring into question here the wisdom of the actions already taken with respect to standardization—not because I am satisfied with them, but because this is not the time or the place to discuss them. Nor do I assume that all further extensions would be unwise. I have already indicated by belief that each proposal requires separate consideration. I do wish, however, to call attention to the fact—as I believe—that the whole machinery of the Association as it now stands is geared to promote the extension of standardization in fields where its wisdom is in question. That is, to say, the Association has established, in its standing committees, a strongly organized permanent machinery for moving the process of standardization forward, without provision for a correspondingly strong system of "checks and balances" to insure broad and critical discussion. It seems inevitable that unless stronger safeguards are provided, a more or less automatic extension of standardization in precarious fields will eventually change the whole character of the Association by placing it in the position of defending an ever increasing body of authoritative doctrine. For once the doctrine of uniformity has been extended beyond clearly defensible limits, there is no natural end-point at which it stops.

The only reliable safeguard, it seems to me, is some measure or combination of measures which will insure that each and every proposal for the establishment of questionable standards under the prestige of the Association be held in abeyance until it has been debated in the publications of the Association; this discussion to refer not to matters of detail, but to the underlying question whether the proposed standards really afford a valid and scientifically defensible measure of that which they purport to measure; whether the uniformity which they attempt to establish will really tend to promote efficient action; in brief, whether the Association can afford to defend them. As to how this may be brought about, I venture to offer the following suggestions, which are purposely stated in rather general terms, and limited to such as are believed to be practicable under the present Constitution.

1. It is suggested that committees generally, and especially those dealing with proposed standards, be instructed, or at least strongly urged, to record the dissent of individual members to statements and recommendations approved by a majority and, where this affords inadequate expression, to file minority reports. I do not know of any present rule of the Association which prohibits or discourages such record of dissent, but it appears not to be customary. Merely to establish the custom of expressing dissent where it exists within committees would, I believe, be the most constructive single step that is practicable. It would encourage and require more careful and exact statement on both sides, eliminating such ambiguous and conflicting statements as result from the attempt to give divergent views the aspect of unanimity, and it would present to the Association formulated questions for discussion rather than a single conclusion to be simply accepted or rejected.

2. For proposals which pass through the Committee on Research and Standards, it is suggested that this committee as a whole, or a sub-committee which takes no part in the initiation of any standards, review each proposal critically from the standpoint of Association policy, and where there seems to be any probability that legitimate questions may be raised concerning the justification of the proposed standardization, arrange to have the question presented for discussion in the *Journal*.

3. With respect to reports originating in committees of the whole Association, it is suggested that those which propose standard procedures to be promulgated in the name of the Association be required to stand before the Association merely as proposals under consideration for a sufficient period to allow ample time for the preparation of written discussions and their publication before they are presented for action by the governing bodies.

4. I would also commend, as a practice which might well be extended, the custom already inaugurated by the Committee on Professional Education of arranging a public discussion of its tentative proposals at each Annual Meeting of the Association. Such meetings might well be developed in such way as to bring out really careful and serious discussion of basic questions rather than details.

REFERENCES

1. American Public Health Association *Year-Book, 1930–1931*, p. 110.
2. *A.J.P.H.*, Supplement, January, 1926, p. 4.
3. Unpublished report in the files of the Committee on Research and Standards.

DISCUSSION

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THIS memorandum refers to the provisional reports of the standing Committee on Professional Education. As *Chairman* of this committee, I wish to state that, in general, I am in accord with the principles and objectives set forth in Dr. Frost's discussion, and it is my impression that this also represents the attitude of the other members of the committee. Furthermore, I have no objection to the concluding recommendations which he presents. However, there are certain points of view in his discussion with which I am unable to agree.

There are statements and implication in Dr. Frost's discussion which are confusing and misleading, because they seem to me to be in conflict with the purpose of the Committee on Professional Education as prescribed by the Constitution and By-Laws of the Association. Article V, Section 5, of the By-Laws provides that

> . . . this committee shall be responsible for carrying out research and the development of standards for professional education and training in public health work and shall perform such other functions as may be delegated to the committee by the Governing Council with the view of maintaining professional qualifications of high standards.

I believe that overemphasis on differences of opinion in regard to the qualifications of public health personnel would result in a stagnation and lack of leadership which would be as unfortunate as the "standardization" of public health workers. The objective of discussions should be to reach agreements on fundamental principles on which to base constructive action. "Standardization" of public health personnel should most certainly be avoided, but minimum standards of educational qualifications are just as essential in public health work as they are in any profession or educational institution. General progress, in my opinion, will be encouraged by an agreement as to the minimum standards which are practicable at the present time, and by a judicious raising of such standards for the purpose of improving the quality of public health service. The American Public Health Association seems to be the organization which can contribute effectively to the accomplishment of this objective.

* This brief statement is made in response to a request of the Executive Secretary of the American Public Health Association. It concerns the memorandum presented by Dr. Wade H. Frost to the Executive Board of the American Public Health Association at its meeting on December 19, 1935.

Optimum Temperature of Incubation for Standard Methods of Milk Analysis As Influenced by the Medium*

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TWO years ago we presented a paper before this Association,[1] in which an incubation temperature of 32° C. for 48 hours instead of 37° C. was recommended for standard agar plates prepared from samples of milk and ice cream. This change was recommended because 32° incubation for 48 hours, (1) yielded higher colony counts than 37° C.; (2) reduced errors due to variations in incubation temperatures; and (3) resulted in a more constant percentage of the maximum count than 37° incubation. Thus, 32° incubation was a fairer and truer measure of quality than 37° incubation. Some of these advantages had previously been presented by others who felt that an incubation temperature near 30° C. should be used in official milk control work.[2, 3]

It has been known for many years that a number of types of media are superior to the present standard agar in regard to the ability to grow the bacteria which are found in milk. Recently, Hiscox, Hoy, Lomax and Mattick,[4] Anderson and Meanwell,[5] Safford and Stark,[6] and Bowers and Hucker,[7, 8] have published results which clearly show the need for changing the formula of the present standard agar.

As stated,[1] it is possible that a change in the composition of standard agar might so affect the counts that the temperature at which the maximum count would be obtained in 48 hours would be somewhat higher or lower than reported. The medium selected for study was tryptone-glucose-skim milk agar as described by Bowers and Hucker.[8]

While the separate ingredients were used early in the study, the medium was prepared for the most part by dissolving 21 gm. of Bacto-tryptone-glucose (Difco Laboratories, Detroit, Mich.) in 1,000 c.c. of distilled water by boiling to which 5 c.c. good quality skim milk, previously sterilized, were added and the complete medium sterilized for 20 minutes at 15 lb.

Standard peptone agar was prepared according to specifications outlined in *Standard Methods of Milk Analysis*.[9]

METHODS

The methods were for the most part the same as used in the previous studies.[1] The main difference was the inclusion of a 28° C. incubator so that curves could be more accurately constructed at this point. Usually 32–38 duplicate agar plates were prepared from a milk sample with each medium. From

* Approved by the Director of the New York Agricultural Experiment Station for Publication as Journal Paper No. 124, February 17, 1936. Read at a Joint Session of the Laboratory and Food and Nutrition Sections of the American Public Health Association, at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 10, 1935.

1 to 3 plates each were incubated at approximately each of the following temperatures, 18°, 21°, 45°, and 55° C., and 5 plates each at approximately 25°, 28°, 30°, 32°, 34°, 37°, and 39° C. The majority of the samples of pasteurized milk were plated on standard agar as well as on tryptone agar.

In each incubator the plates were grouped about a closed flask of water containing a thermometer from which 4 or 5 readings were made during the 48 hour incubation period ± 3 hours. The average temperature reading was assumed to be the approximate incubation temperature of the plates. The average number of colonies was determined for the plates in each incubator.

Average colony counts at each incubation temperature were calculated as percentages of the maximum average colony count. These percentages were plotted against temperatures, and a smooth curve drawn between points from which, by interpolation, the equivalent percentage for any temperature of incubation could be determined.

RESULTS

Thirty-three samples of bottled raw and pasteurized milk were collected from distributors in 16 cities and villages within 75 miles of Geneva. As examined, they represented the milk as it would have been delivered to the consumer.

Bottled Raw Milk—The tryptone agar curves for 11 samples of bottled raw milk collected (with one exception) in May and September, 1935, from 11 distributors in 6 cities and villages are shown in Figure I. One sample of so-called raw milk was apparently mislabelled. It developed a large number of thermophilic bacteria, the maximum count being 326,000 per c.c., which is unusual for raw milk.

FIGURE I—Relation between temperature of incubation and colony counts obtained from 11 samples of raw milk. Tryptone-glucose milk agar used. Incubated for 48 hours.

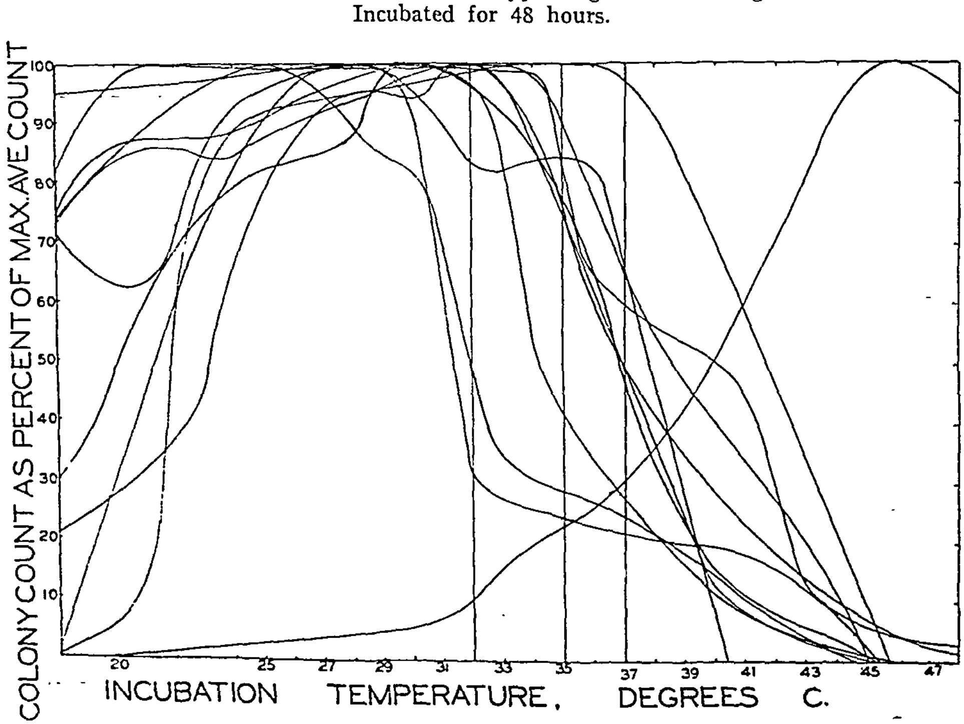


FIGURE II—Relation between temperature of incubation and colony counts obtained from 22 samples of pasteurized milk. Tryptone-glucose milk agar used. Incubated for 48 hours.

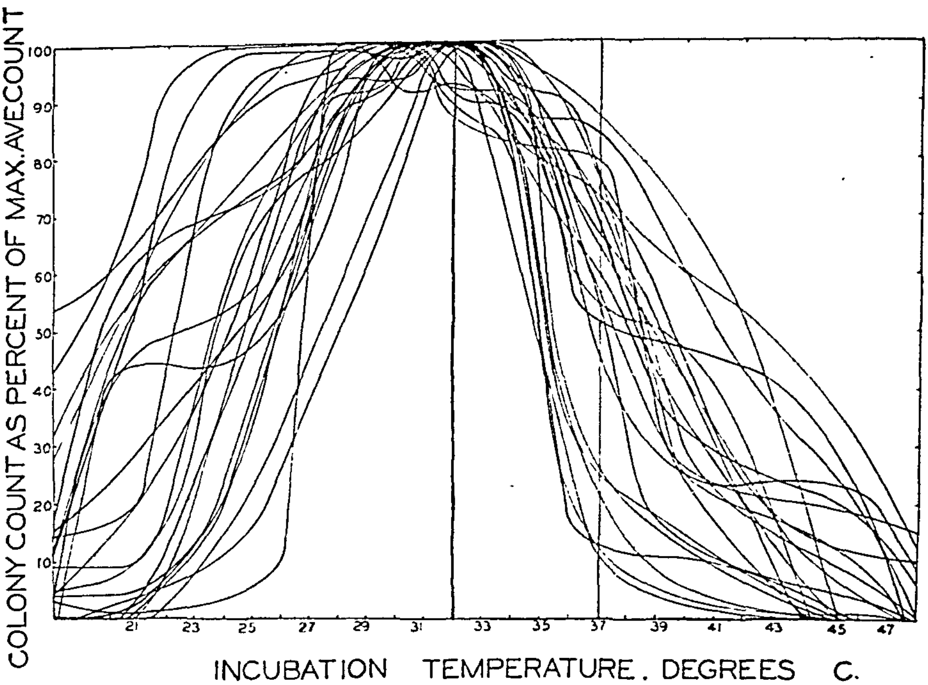
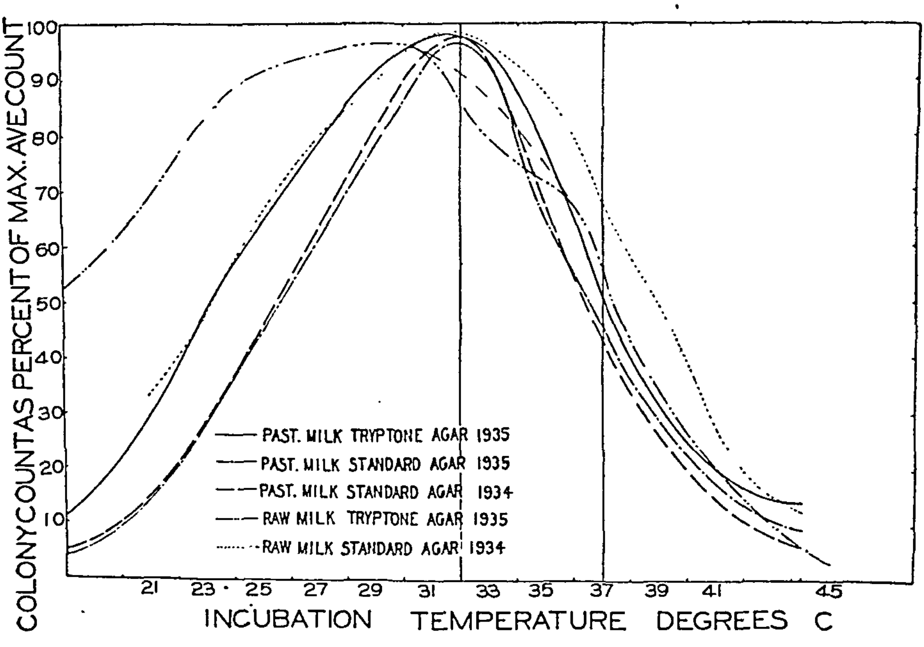


FIGURE III—Curves showing the average relation between temperature of incubation and colony count on tryptone-glucose milk agar and on standard peptone agar as obtained from Figures I and II of the present paper and from Figures I, IV, and V, Pederson and Yale, 1934.



This, together with the fact that the dealer also handled pasteurized milk, indicates that it may have been pasteurized.

In the case of the 14 raw milk samples previously examined [1] by means of standard peptone agar, the maximum colony count on the average was obtained at 32° C., whereas with the 10 normal samples examined on tryptone agar in the present work, the maximum count was obtained at about 30° C. (Figure I). Individual curves for the 10 samples varied greatly.

Bottled Pasteurized Milk—The tryptone agar curves for 22 samples of bottled pasteurized milk collected between January and June, 1935, from 20 dealers in 13 cities and villages, are shown in Figure II. None of the samples showed the presence of thermophilic bacteria when agar plates were incubated at 55° C. These curves resemble those of standard peptone agar for 28 samples of pasteurized milk previously examined,[1] except in respect to the peaks which are considerably broader in the case of tryptone agar.

Whereas the great majority of the standard agar curves have their peaks at 32° C., over one-half of the tryptone agar curves have their peaks below 32° C. and, in 4 cases, below 30° C.

DISCUSSION

In the case of the samples of raw milk plated on tryptone agar, the average percentage of the maximum colony count was 95.5 per cent at 28°, 95.6 per cent at 30°, and only 85.1 per cent at 32° C. (Figure III). The low average at 32° C. was caused mainly by 2 samples which yielded less than 50 per cent of their maximum count at this temperature. The counts at temperatures below 32° C. are in the majority of cases nearer the maximum than found previously with standard peptone agar. Hereafter, previous work is referred to as 1934, the date of publication, while the present work is referred to as 1935.

A comparison of the average tryptone agar curve for the 1935 raw milk samples with the average standard peptone agar curve for the 1934 raw milk samples (Figure III) shows that the use of tryptone agar results in a broader curve and lowers the temperature of maximum colony development from 32° to slightly below 32° C.

At 37° C., standard peptone agar yielded on the average 68 per cent of the maximum count, whereas tryptone agar yielded on the average only slightly above 50 per cent of the maximum. While these percentages are not directly comparable because they are based on different samples, they suggest that 37° C. incubation may yield relatively lower percentages of the maximum count in the case of tryptone than in the case of standard agar. This is due to a relatively greater increase in growth of colonies on the tryptone medium at the lower temperatures.

In the case of the 1935 samples of pasteurized milk, the average percentage of the maximum colony count for tryptone agar was 96.0 per cent at 30°, 97.7 per cent at 31°, 97.2 per cent at 32° C., 94.7 per cent at 33°, and 87.7 per cent at 34° C. Based on 32° incubation, temperatures of 30°, 31°, 33°, and 34°, would on the average have caused errors of −1.2, +0.5, −2.5, and −9.5 per cent respectively. It is thus evident that variations of 1 and 2 degrees below 32° cause less errors than similar variations above 32° C.

Sixteen out of a total of 22 of the 1935 samples of pasteurized milk were plated on standard peptone agar as well as tryptone agar. Comparison of the average standard peptone agar curves for 1934 and 1935 show that they nearly coincide, which is significant because the 1934 and 1935 samples represented different distributors in

most cases. It indicates that a large number of samples would yield similar curves.

The average tryptone agar curve for the 1935 samples of pasteurized milk is broader and has a higher peak than the average standard peptone agar curve. The peak is at a temperature of approximately 31.3° C. as compared to 31.7° for standard agar. The fact that the curve is broader indicates that temperature variations from the point of maximum colony development will cause less errors in tryptone agar plates than in standard agar plates.

In the case of all of the average curves, the 37° C. count is in practically the steepest part of the descending curve, which is significant in showing that temperature variations from this standard cause maximum errors both in raw and pasteurized milk regardless of whether they are plated on standard peptone agar or tryptone agar.

Obviously, it is not practical to have different standards of incubation temperatures according to whether samples are raw or pasteurized; therefore, it would appear that a temperature slightly lower than 32° C. is best suited for 48 hour incubation of tryptone agar plates prepared from milk samples in general.

In the 16 samples of pasteurized milk which were studied, the maximum count on tryptone agar was on the average 44 per cent higher than on standard peptone agar. In 2 instances, maximum counts on tryptone agar were slightly lower than on standard peptone agar, 7.5 and 12.2 per cent, while in the remaining 14 they were from 2.7 to 151.6 per cent higher.

In the case of 6 of the 16 samples of pasteurized milk, plates were held an additional 48 hours to determine further colony development. With standard agar, the maximum 4 day counts were on the average 32.8 per cent higher than the maximum 2 day counts, while with tryptone agar, the maximum 4 day counts were on the average only 17.3 per cent higher than the 2 day counts. The percentage increases in the 4 day counts ranged from 7.4 to 56.1 in standard agar, and from 2.1 to 37.4 per cent in tryptone agar, thus indicating that not only more colonies developed during the first 48 hours on tryptone agar but that they developed more rapidly than upon standard agar.

The latter offers an explanation as to why maximum colony counts were obtained at somewhat lower temperatures on tryptone than on standard agar plates.

SUMMARY

On tryptone-glucose-skim milk agar, plates poured from raw milk developed the maximum number of colonies in 48 hours at temperatures slightly below 30° C. Plates poured from pasteurized milk showed maximum colony development at temperatures slightly above 31° C.

An incubation temperature of 37° C. for 48 hours is fully as undesirable with tryptone agar as with the present standard peptone agar because, (1) it yields only about 50 per cent on the average of the maximum 2 day count; (2) it is in the steepest part of the descending curve, and therefore errors due to variations in incubation temperatures are greater than at 30–32° C.; and (3) the percentage of the maximum 48 hour count varies greatly between different samples. On the other hand, an incubation temperature of 32° C. or slightly lower is fully as desirable with tryptone agar as with the present standard agar because, (1) it yields at least 95 per cent on the average of the maximum 2 day count; (2) it is at the top of the curve where the least errors are caused by temperature variations; and (3) the percentage of the maximum 48 hour count does not vary greatly between samples.

The results obtained with tryptone agar can probably be applied to other media which yield similar increases in colony counts over those obtained on the present standard agar.

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Indian Service Hospitals

IMPROVEMENT and expansion of hospital facilities as part of the program to secure 1,000 additional beds throughout the country for the Indians is being advanced through awards made for hospital construction, financed by PWA.

An ultimate expenditure of approximately $4,250,000 is to include costs of hospital plant, equipment, quarters for personnel, and in many cases the development of utility services. The projects are designed for the Blackfeet and Crow Reservations, Montana; the Sisseton, Yankton, and Crow Creek Reservations, South Dakota; the Cherokee Reservations, North Carolina; and the Chippewa Indians in the State of Minnesota, concentrated at Cass Lake, Minn. In addition, the Indian Service is constructing, by work not built under contract, hospitals for the Zuni Indians of New Mexico, the Warm Springs group in Oregon, and the Western Shoshone reservation in Nevada. Another institution, at Yuma, Ariz., is under construction by contract. The Indian unit of 117 bed capacity at the State Sanatorium, Ah-Gwah-Ching, in Minnesota, and the Indian Service hospital of 38 bed capacity on the Colville Reservation, in Washington, have been completed and are now in use.

All structures are built for permanence, are modern in every respect, and where possible will be constructed of native materials. Stone has been gathered for the Blackfeet project; the Yuma hospital is being built of cement tile manufactured on the site by Indian labor; Indians of the Cherokee Reservation have completed quarrying stone for their hospital, and on the Zuni Reservation all rock was quarried by Zuni Indians. These projects, in addition to providing better hospital facilities, have been and will be the means of furnishing work opportunities in many Indians and white persons.—Department of the Interior *Memorandum*, Mar. 16, 1936.

Further Studies of the Composition of Media for the Bacteriological Analysis of Milk*

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ACCURATE methods are essential in the determination of the number of bacteria found in milk. The composition of the medium used and the temperature of incubation are two of the most important factors which affect this accuracy. Recently, additional thought has been given to the composition of the medium used in *Standard Methods of Milk Analysis,* and an effort has been made to collect further data on the effect upon the number of colonies produced on the plates by changing the temperature of incubation. The data here presented are given to substantiate further our earlier work [1] which suggests that an agar containing tryptone, glucose, and skim milk should be substituted for the peptone-beef extract agar now accepted as the standard for milk work.

The historical development of the composition of standard agar has been outlined [1] in connection with studies which showed that the addition of yeast extract as well as certain other modifications of the present standard agar did not sufficiently affect the number of colonies produced to warrant their substitution for the present standard agar. However, it was found that a medium consisting of tryptone, glucose, and skim milk increased the count above that on standard agar by 33 per cent when raw milk samples were studied, and 147 per cent when pasteurized milk was used.

In the following comparative study the methods used were essentially those given in the *Standard Methods of Milk Analysis* of the American Public Health Association, with the exception that the media under study were substituted when necessary for the standard agar. Incubation was at 37° C. for 2 days.

Percentage Increase in the Number of Colonies on Standard Agar Caused by the Addition of Skim Milk and Glucose—Recent work by Stark and Safford [2] has shown that the addition of skim milk to standard agar increased the colony count. This investigation confirms earlier work by Hiscox, Hoy, Lomax, and Mattick [3] and others.

A study of 144 raw and 173 pasteurized milk samples confirms in general the results of these investigators. It has been found that the addition of skim milk to standard media will increase the colony count by 17 per cent, while the addition of glucose to standard agar produced a 35 per cent increase.

* Approved by the Director of the New York State Agricultural Experiment Station for Publication as Journal Paper No. 125. Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 10, 1935.

With pasteurized milk a similar (Table I) increase was found. From these results it is obvious that the addition

TABLE I

EFFECT OF THE ADDITION OF SKIM MILK AND GLUCOSE ON THE NUMBER OF COLONIES PRODUCED ON STANDARD AGAR

Number of Samples	*Percentage Increase in Number of Colonies on Standard Agar by the Addition of* Skim Milk	Glucose	Skim Milk + Glucose
144, Raw	17	35	..
173, Pasteurized	25	31	48

of either skim milk or glucose to standard agar will materially increase its efficiency.

Relative Numbers of Colonies Developing on Standard and on Tryptone-Glucose Agar—Since the report [1] on the relative efficiency of standard and tryptone-glucose-skim milk agar, 204 raw and 240 pasteurized milk samples have been studied (Table II). It was found that tryptone-glucose agar increased the colony count in raw milk by approximately 34 per cent; and in pasteurized milk by 47 per cent. These findings confirm, in general, the conclusions that a tryptone-glucose medium is much more efficient than the standard agar.

TABLE II

RELATIVE NUMBER OF COLONIES PRODUCED ON STANDARD, TRYPTONE-GLUCOSE AND TRYPTONE-GLUCOSE-SKIM MILK AGAR

Number of Samples	*Relative Numbers of Colonies per c.c. Expressed in Percentages* Standard Agar	Tryptone-Glucose Agar	Tryptone-Glucose-Skim Milk Agar
204, Raw	100	134	135
240, Pasteurized	100	247	...

The Effect of the Addition of Skim Milk to Tryptone-Glucose Agar—Since tryptone-glucose agar was suggested as a standard medium for the bacteriological analysis of milk, some discussion has arisen regarding the use of skim milk in connection with this medium. Certain difficulties arise when skim milk is recommended to be added to a medium as a routine procedure. Fresh skim milk is not available in all laboratories, and when added to agar it has been found in some instances to cause the appearance of a fine precipitate. This is true especially if the medium is held for any time in a liquid condition just prior to use. On the other hand the skim milk has certain recognized advantages when added to media. It has been reported to increase the number of colonies and also to impart an opalescence to the medium which brings into more bold relief the smaller colonies thus facilitating the counting of the colonies. For this reason, it was thought important to determine whether the addition of skim milk to the tryptone-glucose agar sufficiently increased its efficiency to offset these disadvantages.

TABLE III

EFFECT OF SKIM MILK ON THE NUMBER OF COLONIES PRODUCED ON TRYPTONE-GLUCOSE AGAR

Number of Samples	*Relative Numbers of Colonies per c.c. Expressed in Percentage* Tryptone-Glucose Agar	Tryptone-Glucose-Skim Milk Agar
326, Raw	100	104
421, Pasteurized	100	108

A total of 326 raw and 421 pasteurized milk samples have been studied to determine this matter. It was found (Table III) that in both pasteurized and raw milk the increase in the number of colonies on the medium which contained the skim milk over the plain tryptone-glucose agar was not sufficient to make a material difference in the end results obtained. On an average, in pasteurized milk, the addi-

tion of skim milk increased the counts by approximately 8 per cent; in raw milk an average of 4 per cent.

The Relative Efficiency of Neopeptone-Glucose Agar and Tryptone-Glucose Agar—There are several possible variations in the routine preparation of peptones under commercial conditions. During the production of tryptone it was found that by varying the process another type of nitrogen constituent for bacteriological media could be prepared which was given the name neopeptone. Neopeptone has been used extensively as a nitrogenous base for media to grow certain groups of organisms. Inasmuch as it appears to be a readily available source of nitrogen for certain types of bacteria it was thought advisable to study its efficiency in comparison with that of tryptone as a source of nitrogen in media for the bacteriological analyses of milk.

In all of the earlier studies in connection with the comparison of media, it has been found that the widest differences in colony counts occurred with pasteurized milk. For this reason, 420 samples of pasteurized milk were secured (Table IV) and plated both in

TABLE IV

RELATIVE NUMBER OF COLONIES PRODUCED ON NEOPEPTONE-GLUCOSE AGAR AND TRYPTONE-GLUCOSE AGAR

Number of Samples	*Relative Numbers of Colonies per c.c. Expressed in Percentages*	
	Neopeptone-Glucose Agar	*Tryptone-Glucose Agar*
420, Pasteurized	100	137

neopeptone-glucose agar and tryptone-glucose agar. It was found on an average that the tryptone-glucose agar produced a 37 per cent increase in colony count over that produced by neopeptone-glucose agar. In addition it was also noted that in 49 per cent tryptone-glucose agar gave the highest count, while in 45 per cent the highest count was found in neopeptone-glucose agar. In the remaining cases the counts were so nearly identical that no difference in the efficiency of the medium was recognizable.

From this comparative study it is obvious that tryptone is to be preferred to neopeptone as an available source of nitrogen for the organisms commonly encountered in pasteurized milk as reflected by the relative number of colonies developing on plates prepared with these two ingredients.

CONCLUSIONS

It is concluded that this further study confirms our earlier finding that tryptone-glucose agar is more satisfactory than standard agar for use in the bacteriological analyses of milk. The addition of skim milk to this medium increases the efficiency slightly.

It has been found that tryptone is approximately 37 per cent more efficient than neopeptone from the standpoint of number of colonies developing on plates made from pasteurized milk. Although the addition of skim milk and glucose to the present standard agar increases the colony count, such a modification does not result in standard agar becoming as efficient a plating medium as tryptone-glucose agar or tryptone-glucose skim milk agar.

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DISCUSSION

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WE have used standard agar, standard agar plus skim milk, and tryptone-glucose-skim milk agar in a comparison of counts in our regular routine work. Results have been secured from 40 samples of raw milk and 45 samples of pasteurized milk. Our findings in regard to a comparison of these counts may be summarized as follows:

Frequency of excess, by certain percentage, of the different counts over the smallest count—

		Standard Agar	*Skim Milk Agar*	*Tryptone Agar*
Over 25% excess—	Raw	12	20	20
	Pasteurized	11	37	30
" 50% "	Raw	2	9	10
	Pasteurized	8	31	26
" 100% "	Raw	1	4	7
	Pasteurized	4	26	24
" 200% "	Raw	1	2	1
	Pasteurized	2	14	15

We have found that the plain and tryptone-skim milk agar plates are equally satisfactory from the standpoint of counting the colonies on the plate. The standard agar with skim milk produces a more turbid plate and is therefore less satisfactory to count. Particular attention is directed to increasing disparity between raw and pasteurized milk frequencies in excess over the smallest count as shown in the table.

Excesses of over 200 per cent are encountered in the standard agar with skim milk and in the tryptone-glucose-skim milk agar far more frequently among the samples of pasteurized milk than among the samples of raw milk.

Self-Preservation

PUBLIC health issues were put in homely terms by a judge in Tennessee who, according to the Commonwealth Fund *News Letter*, said that he would gladly pay what the health unit cost him as a taxpayer, just so that he might avoid having to sit up with his neighbors when they got typhoid fever.

Evaluation of Certain Media for the Detection of Colon Organisms in Milk*

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AN ideal medium for the detection of colon organisms in milk should permit growth and gas production by small numbers of *Escherichia-aerobacter* organisms, and inhibit the growth of those lactose fermenting gas producing bacteria not belonging to this group. Aerobic and anaerobic spore-producing rods capable of fermenting lactose with the production of gas are well known (Creel, 1914; Winslow, 1916; Hall and Ellefson, 1918; Kahn, 1918; Norton and Barnes, 1928; Meyer, 1918; Ewing, 1919; Perry and Monfort, 1920; Hinman and Levine, 1922; Lisk, 1923; Norton and Weight, 1924; Schreiner, 1927; and Koser and Shinn, 1927).

Mixtures of bacteria, a lactose fermenting but non-gas-producing organism growing in the presence of non-lactose-fermenting bacterium but one which can produce acid and gas from glucose, may cause gas production in the absence of *Escherichia-aerobacter* organisms (Sears and Putnam, 1923; and Holman and Meekison, 1926). A satisfactory medium should inhibit the growth of one or both of these types of bacteria which may be responsible for false tests.

The toxic substances added to culture media to prevent the growth of false test organisms may also retard or inhibit growth and gas production by small numbers of *Escherichia-aerobacter* organisms (Stark and England, 1933). A satisfactory medium for the detection of colon organisms in milk should not be materially affected by changes in pH or by the additional protein material in the amounts of milk used as inoculum, which must be added to the medium (Stark and Curtis, 1935). The ideal medium may be approached but probably will not be attained.

The results obtained by us, in testing the ability of 6 media to inhibit the growth of bacteria often responsible for false tests, are shown in Tables I and II. Bacteria able to produce gas from glucose, such as the salmonella and proteus groups, are able to grow in all of these media. (Data to substantiate this statement are available but are not presented here.) The hydrolysis of lactose by the cocci, the growth of which is not inhibited in some of these media, would make possible gas production by cocci and members of the proteus group. The detoxifying effect of adding 1 c.c. of milk to all of these media, except formate ricinoleate broth, can be readily observed. These facts, we believe, show conclusively the unreliability of crystal violet, Dominick-Lauter, gentian violet, and brilliant green bile broths for use in the detection of *Escherichia-aerobacter* organisms in milk. The addition of 0.5 per cent sodium formate to brilliant green bile

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broth easily doubles the total population of bacteria and the amount of gas produced by *Escherichia-aerobacter* organisms (data available, but not presented), and does not make this medium any less inhibitory to the growth of bacteria responsible for false tests.

Experiments conducted on formate ricinoleate broth, Stark and England, 1935, and Stark and Curtis, 1935, to ascertain its fitness as a medium for the detection of colon organisms in water and milk have shown 0.1 per cent sodium ricinoleate to retard slightly the growth of *Escherichia-aerobacter* organisms, but to permit abundant growth and gas production by one or more cells of this group. The growth accelerating action of 0.5 per cent sodium formate overshadows the growth retarding action of sodium ricinoleate, resulting in a larger population of bacteria than is produced in the lactose-peptone broth containing neither formate nor ricinoleate. The increase in the rate of growth and the larger total population of *Escherichia-aerobacter* organisms is believed to be due, in part, to the buffering action of sodium formate. The addition of formate to the medium is also the source of the increased amounts of gas. *Escherichia-aerobacter-salmonella* bacteria are able to produce CO_2 and H_2 from formic acid. This action results in the formation of NaOH and $NaHCO_3$ which prevents the pH of formate ricinoleate broth from going lower than pH 6.0. A medium containing lactose and maintaining a pH of 6.0 or higher is an excellent environment for growth and gas production by *Escherichia-aerobacter* organisms.

The fact that the salmonella group of bacteria is also able to produce gas from sodium formate is an advantage rather than a disadvantage, since the presence of these bacteria in milk should not be tolerated. Of the bacteria, tested by us, able to grow in formate ricinoleate broth, only the *Escherichia-aerobacter* and salmonella groups were able to produce gas from sodium formate.

TABLE I

GAS PRODUCTION BY LACTOSE FERMENTING BACTERIA IN TUBES OF BROTH

With and Without the Addition of 1 c.c. of Milk

	B. aerosporus	*B. asterosporus*	*B. tertius*	*Cl. aerofetidum*	*Cl. butyricum*	*Cl. chauvei*	*Cl. multi-fermentans*	*Cl. oedematis-maligni*	*Cl. sphenoides*	*Cl. welchii*
Crystal violet	—	—	—	—	—	—	—	—	—	—
Crystal violet + milk	+	—	+	+	—	—	+	—	+	+
Dominick-Lauter	+	—	—	+	—	—	+	—	+	+
Dominick-Lauter + milk	+	—	+	+	—	—	+	—	+	+
Gentian violet	—	—	+	+	—	—	+	—	+	+
Gentian violet + milk	+	—	+	+	—	—	+	+	+	+
Brilliant green bile	—	—	—	—	—	—	—	—	—	—
Brilliant green bile + milk	—	—	+	+	—	—	+	—	—	—
Brilliant green + formate	—	—	—	—	—	—	—	—	—	—
Brilliant green + formate + milk	—	—	+	+	—	—	+	—	—	—
Formate ricinoleate	—	—	—	—	—	—	—	—	—	—
Formate ricinoleate + milk	—	—	—	—	—	—	—	—	—	—

Results of duplicate tests repeated

TABLE II

GROWTH OF COCCI IN TUBES OF BROTH

With and Without the Addition of 1 c.c. of Milk

	Streptococci of Human Fecal Origin						*Strep. Fecalis*	*Strep. Lactis*	*Staph. Aureus*
	10c1	*1d1*	*8d1*	*17c1*	*8b7*	*8b5*	*24*	*21*	
Crystal violet	+	—	—	—	—	—	—	—	—
Crystal violet + milk	+	+	+	+	+	+	+	+	—
Dominick-Lauter	—	—	—	—	—	—	—	—	—
Dominick-Lauter + milk	+	—	—	+	—	+	+	+	—
Gentian violet	+	—	—	+	—	—	+	—	—
Gentian violet + milk	+	+	—	+	+	—	+	—	—
Brilliant green bile	+	—	—	+	—	—	+	—	—
Brilliant green bile + milk	+	+	—	+	+	—	+	—	—
Brilliant green + formate	+	—	—	+	—	—	+	—	—
Brilliant green + formate + milk	+	—	—	—	—	—	+	—	—
Formate ricinoleate	—	—	—	—	—	—	—	—	—
Formate ricinoleate + milk	—	—	—	—	—	—	—	—	—

Results of duplicate tests repeated

It is believed that formate ricinoleate broth can be successfully used for the detection of colon organisms in milk because: (1) it inhibits the growth of false test organisms; (2) it permits growth and gas production by small numbers of *Escherichia-aerobacter* organisms; (3) it results in increased bacterial growth and gas production, by maintaining a favorable environment for growth; and (4) it is little affected by the additional protein material which must be added when inoculating media with 1 c.c. amounts of milk.

SUMMARY

The results of studies reported in this paper are believed to justify the following conclusions:

1. Crystal violet, Dominick-Lauter, and gentian violet broths are not satisfactory for use in the detection of colon organisms in milk.

2. Brilliant green bile broth has a better selective action which is partially destroyed by the protein material in 1 c.c. amounts of milk used as inoculum.

3. Brilliant green bile broth may be improved by the addition of 0.5 per cent sodium formate.

4. Formate ricinoleate broth is satisfactory for use in the detection of colon organisms in milk. It inhibits the growth of false test organisms and permits growth and gas production by one or more cells of *Escherichia-aerobacter* organisms. The nutritive value and buffering action of sodium formate results in increased growth and gas production. Tubes of this medium having 1 c.c. amounts of milk added, as must be done in testing milk, do not permit the growth of false test organisms.

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The Prevention of Venereal Diseases in Sweden*

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AFTER a thorough investigation which was carried on over a very long period of time, a law was passed in Sweden by action of Parliament in 1918 concerning methods to be employed for the prevention of venereal diseases. The intent of this law was to employ the same methods for the prevention of venereal diseases as were used for other communicable diseases.

I shall now give a short account of the requirements of the law against venereal diseases and the procedures for enforcing it, and show curves demonstrating the variations in the frequency of venereal diseases.

The law contains the following principal points:

1. Every person suffering from venereal disease must submit to treatment by a physician and must follow his directions.
2. Every such person has the right, irrespective of the size of his income, to obtain free medical treatment and medicine, in case he is not being treated by a private physician. This includes free injections, free serologic examinations, as well as free certificates required by the public health authorities as to complete recovery or continued treatment. Hospitalization in a special general ward is also furnished free of charge.
3. Every physician treating a new case of venereal disease must try to obtain information about the source of infection.
4. Against patients, who do not properly follow up their treatment, and against individuals identified as the source of infection but unwilling to come to treatment, certain compulsory measures may be taken.
5. A person who knows that he or she suffers from venereal disease and who by carelessness causes its transmission, is subject to punishment of a severity up to forced labor.
6. Every marriage partner prior to obtaining a marriage license has to sign a statement certifying his or her freedom from venereal disease in a contagious stage.
7. The local public health authorities must publish information about the existence of the clinics for the treatment of venereal diseases.

The medical control of prostitution was simultaneously abolished. Opinions varied widely at one time among the physicians as to the expediency of abolishing this control but in the vagrancy law there is a good weapon available to the police for dealing with this class of women. The term vagrant as used in the legislation covers not only vagabonds in the strict sense of the word but also persons with fixed abode known to lead a harmful life. The punishment prescribed for vagrancy consists in confinement in a workhouse. Sentence of this is passed by the provincial governor after a preliminary warning.

The law defines venereal diseases as syphilis, gonorrhea, and venereal ulcer. Treatment is required during the infectious stage. By this is meant as long as infectious symptoms are present or as long as there is any possible danger of the infection being transmitted.

* Read before the Health Officers Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

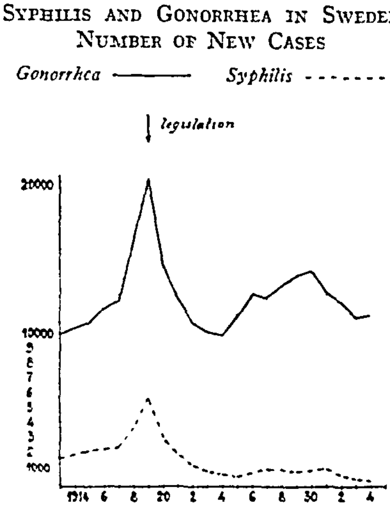

CHART I—Cases of venereal disease have been legally reportable since 1913, but in the beginning the reporting was probably not complete.

After a sharp increase during the war, the law was put into action and the decrease was promptly made apparent during the first years thereafter. During 1934, 11,500 new cases of gonorrhea and 431 new cases of syphilis were reported.

Gonorrhea has decreased to one-half its maximum. Syphilis has decreased to less than one-tenth what it was in 1919. There were in 1919, 3,000 new cases of venereal ulcer; in the last year only about 100. A great part of these were sailors, infected abroad.

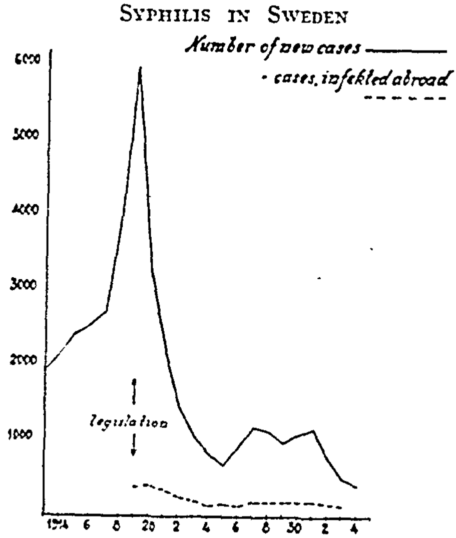

CHART II—This gives the figures for syphilis in Sweden: 6,000 new cases in 1919, 431 in 1934. During the last years about a fourth of the new cases were infected abroad. Of 431 new cases, 110 occurred in Stockholm, 212 in other cities containing a total population of 1,500,000 inhabitants, and 109 cases were in rural districts containing a population of 4,000,000 inhabitants.

This is applied in such a way that, for instance, a person infected with syphilis is entitled to free medical care for 3 years from the beginning of treatment. Pregnant women infected with syphilis at any time earlier likewise have the right to continue treatment to its completion.

Examination and treatment free of charge are furnished by the rural district physicians and by the health officers of the cities. In cities of more than 20,000 inhabitants there must be a special clinic with different receiving hours for men and women. If possible, women doctors are employed at the clinics for women. Special training is required of all these physicians.

The salaries of the physicians, the cost of medicine, and the serologic tests are paid for by the Swedish Government while the local communities themselves furnish the space for the clinics, the non-medical personnel required and the cost of hospital care. The physicians at the clinics have fixed salaries; the other physicians are to be reimbursed from the central government. If the work is on a large scale, fees are reduced along certain lines. The salaries of the physicians at the clinics are revised annually with regard to whether the work has increased or decreased.

A physician who has made the diagnosis of venereal disease in a person is required to inform the patient of the nature of his infection and the danger of transmitting it to others. He must also give the patient a pamphlet with printed directions as to what measures he must take in order to prevent spreading the disease. The

patient is also informed that it is forbidden by law to marry under these conditions or to subject any other person to infection. The stipulations regarding punishment are stated in the directions. The sick person is required to acknowledge in writing that he has received these directions. This point is especially important, as in this way the patient is made to understand that the State has control over his conduct and that carelessness cannot subsequently be excused on the plea of ignorance of the law. These written acknowledgments may be and have been used as evidence in court.

The physician is required to care for the sick person during the whole period of sickness or to report to the physician in charge of the health department if the patient has stopped treatment without furnishing proof that he is being treated by another physician.

It is the duty of the physician who first discovers venereal disease in a patient to try to trace the identity of the individual responsible for transmitting the infection.

The health officer in each city or province is the supervisor of this work. The report to the health officer of a new case contains the date of birth of the patient and the community of which he is a resident, but not his name. The report also contains the source of infection, if the patient has been able or willing to reveal the same, and in this case the name and address of the source is given. As a protection against blackmail the physician has to use his judgment as to the truthfulness of the patient's statement. In case the information is sufficiently detailed to locate the source of infection, a letter in a plain envelope is sent to this person. The number of the post office box is, however, stamped on the envelope so that the letter will be returned if the addressee is not located. This letter contains a printed order for said person to submit to examination and to deliver a certificate that either he is free from venereal disease, or is under treatment. The letter plainly states that the person may choose his or her own physician, but at the same time a list is enclosed stating which physicians or clinics will render free examinations and treatment. If the letter is returned or if no statement is received from the addressee within 4 days, a registered letter is sent. If this is returned or no statement received within 6 days the health officer makes out a notification to the police to bring the person for examination. The suspected source of infection is visited by the police or a police nurse and is then given one or two days to go to the clinic voluntarily, unaccompanied by the police.

The patient or "the new case," after the inquiries made at the first visit to the physician, is unmolested by the health authorities if he continues his treatment regularly. If he is irregular or discontinues treatment without a properly arranged transfer to another doctor, the treating physician has to reveal his name to the health officer and the procedure just described in connection with the search for the source of infection is applied. In this case the police order contains a notification that the person in question must be hospitalized. It is possible for him to avoid hospitalization if it is thought that the patient really will continue treatment regularly. However, if hospitalization is ordered, the patient must submit to hospital treatment until released by the health officer.

In Stockholm girls under 18 years of age are always hospitalized and not treated at the free clinics, in order to protect them from undesirable contact with older female patients in the clinics. In all matters pertaining to the investigation of patients and re-

porting of cases secrecy on the part of the doctors and nurses is required.

The wisdom of the venereal disease legislation at first was rather generally doubted by physicians, but in actual practice the difficulties have not been very great. The success of the law depends upon several factors. No single factor is more important than the coöperation of the doctors. Here it is a pleasure to report the loyalty of the profession. If cases exist which are not reported they seem to be cases of little importance in the spreading of the disease. No foci of social evil have ever been known to escape.

In retrospect one might admit that the doctors feared that the law would ruin their private practice. This of course did not prove to be the case. On the contrary the patients now are compelled to get complete treatment and they usually do their best to do so under complete protection against official interference. Patients who can pay the doctor, in general, are treated by private physicians in order to avoid the publicity of taking treatment at a clinic. The free clinics, at the same time that they erected a protection against excessively expensive private treatment, also created a number of salaried positions for specialists in venereal disease. The considerable decline in venereal disease which has resulted has of course influenced the income of the doctor, just as the disappearance of typhoid fever deprived the doctor of the former generation of the sum he used to set aside for his coal bill.

To most patients the shock of the diagnosis and being confronted with the responsibility which marks the procedure of the first visit to the doctor, suffice to make the patients follow the directions. Only against more or less

SYPHILIS IN STOCKHOLM
NUMBER OF NEW CASES IN 10,000

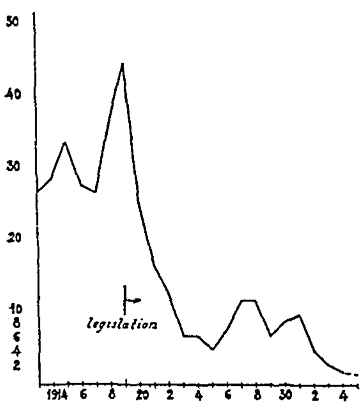

CHART III—This shows the number of new cases of syphilis in Stockholm per 10,000 population. In 1919 there were about 44 per 10,000 and now there is a rate which scarcely reaches 2 new cases in 10,000 people.

SYPHILIS IN STOCKHOLM, OSLO AND COPENHAGEN
NUMBER OF NEW CASES IN 10,000

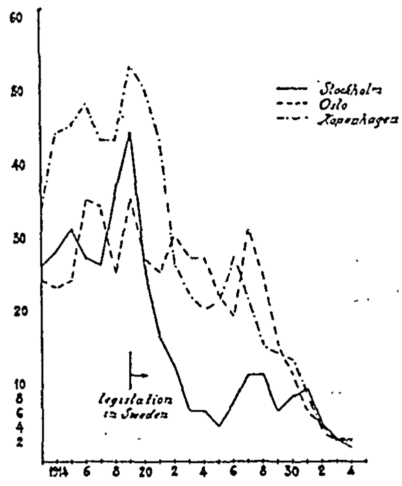

CHART IV—This gives a comparison of the prevalence of syphilis in the three capitals: Stockholm, Oslo, and Copenhagen.

In Norway and in Denmark there has been provision for free treatment for the poor for many years, and during the last years the health authorities in Oslo and Copenhagen have tried to search for the sources of infection in about the same way as we have done in Sweden.

Oslo and Copenhagen still have rates which are 50 per cent higher than those of Stockholm where the drop was earlier and more apparent.

anti-social individuals has it been necessary to enforce all the compulsory measures of the law.

The search for the sources of infection obviously is another cornerstone of the law. The mere existence of this clause has the effect of bringing a great many sources immediately under treatment without their even being reported as such. This is particularly the case with married people and with those in extra-marital relationships of a somewhat lasting nature. The actual figures for reported sources appear low, even when most patients know from whom they have got the infection. Rural districts and smaller towns may report figures as high as 50 per cent; in the larger cities the figures are much lower. In Stockholm a few years ago they were as low as 3 to 7 per cent, but as a result of intensive work by the health department sources are now reported in 15 per cent of the new cases. The personal equation of the physician of course plays a rôle and, if the figures of reported sources from a clinic show a tendency to drop, proper encouragements are instituted.

It is possible to locate the majority of the reported sources. Among those with whom contact has thus been established very few prove to be erroneously reported; others are able to prove themselves non-infectious—they have had time for treatment while the procedures of reporting and search have been going on. As many as 80 per cent of the reported sources have come under treatment in the city of Gotenbourg and as many as 50 per cent in Stockholm. For the whole country in the past year 1,072 sources of infection have come under treatment. This figure for sources is higher than during previous years.

In the clinics, where the less stable part of the patients are found, every effort, by such means as filing cards, is made to keep permanent track of the patients. The follow-up of irregular ones locates and brings back to treatment fully two-thirds, while one-third cannot be located. In this way 800 patients were brought back to treatment. This number probably includes many individuals in the infectious stage whose irresponsibility makes it doubly important that their treatment be complete.

Since the law was put in effect in 1919 there has been a considerable decrease in the number of persons suffering from the venereal diseases. This has been most pronounced in the rural districts and in the small towns, from which syphilis has practically disappeared. May I mention that Sweden has 6,000,000 and Stockholm 523,000 inhabitants.

Since 1917 Sweden has enjoyed very progressive legislation for the care of illegitimate children. This, in combination with the law against venereal diseases, has resulted in a marked decrease in the occurrence of congenital syphilis, which has dropped to about one-tenth of its previous figure. The organization of this care was started by the Swede, Velander, one of the pioneers in the modern treatment of syphilis. At present there exist in Sweden 3 nursing homes for children with hereditary syphilis, which each year have a greater number of vacant places. The babies are kept in these homes for 3 years and sometimes longer. A follow-up of 140 former patients who could be located, showed that 118 had no defect at all, either mental or physical, 4 to 25 years after discharge from the homes. Seventy-four had been kept under observation more than 10 years.

Though the law against venereal diseases has been in operation only since 1919, there is already a marked decrease in the occurrence of syphilis of the internal organs. A gumma of the liver is practically never seen;

syphilis of the heart and aorta is becoming a rarity; and the metasyphilitic diseases of the central nervous system are diminishing. Care has of course to be taken in the explanation of this development. The introduction of the Wassermann reaction and of arsphenamin a decade earlier than the legislation under discussion are factors in the history of syphilis, which here might count more than our law.

SUMMARY

Two points form the basis for the Swedish legislation against venereal diseases:

First—The search for and detection of the source of infection as in other contagious diseases.

Second—Though personal liberty is safeguarded in Sweden at least as carefully as in America, the law imposes a very definite restriction of freedom upon persons afflicted with venereal disease, compelling them to accept an amount of medical treatment, not according to their own choice, but according to the decision of responsible physicians. Upon individuals, under such control and to whom complete medical facilities for treatment are available at no cost, the nation further imposes the responsibility not to propagate the disease. For willful neglect of this responsibility, punishment up to the severity of forced labor can be imposed.

The results correspond to the ability of medical science of today in the treatment of these diseases: for syphilis the results are even better than could have been hoped for, but for gonorrhea decidedly poorer. It is believed that considerable further decrease in the frequency of gonorrhea might be obtained by better methods for treatment in order to get the patient non-infectious in a shorter time and by procedures of individual prophylaxis.

Thus we have successfully applied to the combating of the venereal diseases the experience and principles gained in epidemiology, medicine, and public health administration.

DISCUSSION

THOMAS PARRAN, JR., M.D.
State Commissioner of Health, Albany, N. Y.

DR. RIETZ has been very conservative in his presentation of this subject.

During recent years, reports have been coming out of the several Scandinavian countries, indicating a marked reduction in the prevalence of syphilis. In order to check the accuracy of these reports and to investigate the methods being used for the control of the venereal diseases in the Scandinavian countries, I visited Sweden, Denmark, and Norway this summer.

Without doubt, syphilis has become a rare disease in Sweden and in the other Scandinavian countries. We were convinced that notification of early cases of syphilis is relatively complete and accurate. The continued high recorded prevalence of gonorrhea, among other facts, supports this conclusion. Dr. Rietz has told you that only 431 cases of syphilis were recorded in Sweden last year. The population of Sweden is more than 6,000,000—approximately the same as upstate New York. Last year, there occurred in upstate New York more than 11,000 cases of syphilis. In similar measure, syphilis has become a rare disease also

in Denmark and Norway. In each of these countries, there are two basic principles underlying the control efforts: *first*, every infected person must take treatment; *second*, treatment without cost and of a good quality is made freely available.

The cold statistics are corroborated on every hand. Professors in the medical schools have difficulty in finding a sufficient number of early cases of syphilis to demonstrate to their pupils. In the Rigs Hospital in Copenhagen, the dean of the medical faculty and professor of obstetrics showed us his records—nearly 2,000 deliveries each year, of which 60 per cent are of unmarried mothers. During the past 3 years the number of cases of syphilis, as shown by routine Wassermann tests and careful histories, has varied from 30 to 35 per year, and the number of cases of congenital syphilis from 2 to 5. In the Wehlander homes for congenital syphilitics are many empty beds.

In Denmark and Sweden and also in Great Britain, the control of the venereal diseases is primarily a responsibility of the central government. No other health activity is the subject of such centralized responsibility. This indicates, I think, the importance which is attached to this problem.

During recent months, health officers in this country have been encouraged to hope that one or another method recently proposed for the prevention or cure of poliomyelitis would prove of value. Each of these methods has attracted national attention. The newspapers have described them in first page stories.

Splendid as it would be to have weapons with which to eradicate poliomyelitis, the effect upon the public health of this country would be infinitesimal as compared with the control of syphilis as has already been done in Sweden.

Dr. Rietz has brought us a gripping story of actual accomplishment. Syphilis in Sweden is no longer a major health problem. The methods by which this result has been accomplished can be applied to the United States. Dr. Rietz has described to us one of the most outstanding public health accomplishments of our generation; truly, it is a modern miracle in medicine.

In closing, may I paraphrase a statement of Dr. Stokes: How long shall we health officers in the United States concern ourselves only with the minor plagues while this major plague of syphilis continues unabated?

Patient of Louis Pasteur

According to newspaper accounts, Joseph Meister of Paris who, at the age of 9 was the first person whose life was saved by Louis Pasteur after bites from a rabid animal, arrived in this country in February at the invitation of the French Chamber of Commerce of the United States. M. Meister is now 60 years of age and his appearance in this country is inspired, according to the report, by a desire to revive interest in Louis Pasteur. Another reason, of course, is the French motion picture on the life of Pasteur which is running at the same time with an American film of the same story, both of which are highly commended by the critics.

Shellfish Report from the Standpoint of the Sanitary Engineer*

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FOR the purpose of this discussion the term "shellfish report" is assumed to be the laboratory's report of the results of the bacteriological examination of shellfish when made according to the recommendations of a committee from this Association, adopted in 1922.[1] In fairness to the 1922 committee it should be remembered that the method of examination it recommended was intended to apply specifically to oysters only.

REASONS FOR THE SHELLFISH REPORT

The underlying reason for requesting a bacteriological examination of shellfish is a desire to know whether or not the use of the shellfish as a food may cause illness in the consumer. Unfortunately, it is not practicable for the laboratory to give a "yes" or "no" answer to this question. This fact at once makes the shellfish report, by itself, of less value than it might otherwise be. In addition to this the laboratory does not ordinarily examine the portion usually eaten, the "meat" or body of the shellfish, but examines the shellfish liquor.

It appears that the committee's reason for not recommending the examination of oyster meats, or bodies themselves, was that the additional labor and care involved in making examinations of oyster meats was, in their opinion, not justified by the additional information obtained.

The present method of examining shellfish can be said to be essentially a method for examining the liquid which has been in contact with the body of the shellfish, or the rinsings, so to speak. A portion of the contamination the oyster gathered from the water in which it was immersed is thus secured either more or less directly from oyster liquor or from the rinse water in which shucked oysters have been thoroughly agitated. The report thus made may be some measure of the oyster's activity in accumulating pollution from the surrounding water, but by itself is of course no reliable measure of its pathogenicity when consumed as food.

Another consideration which tends to lessen the value of the shellfish report when considered by itself is the fact that organisms of the coli-aerogenes group which are sometimes found in shellfish secured from clean areas are evidently not all of fecal origin.

These are some of the shortcomings of the present method of shellfish examination.

Some of the more useful phases of the shellfish report are as follows:

Taken by itself the shellfish report on shucked shellfish can be useful in checking the cleanliness of shucking-house operations and will tend to show

* Read at a Joint Session of the Laboratory, Food and Nutrition, and Public Health Engineering Sections of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

at which stage of the shucking and packing operations contamination is entering the product. It is thus useful in bringing about improvements in the cleanliness of shucking-house operations.

When the report is made in inland cities, on shellfish that were clean when they were shipped from the sea coast and which arrived in the original unopened container, it is an indication of the care with which the shellfish were iced and protected from contamination in transit. Making use of the shellfish report in this manner affords practically the only first-hand information concerning the condition of the shellfish as they reach the market that the health officer in the inland city has.

It has, by itself, and modified so as to include the examination of shellfish meats, also been useful in measuring the efficiency of clam cleansing plants. Used in this connection it has again, however, not been 100 per cent satisfactory, because the report can give no conclusive information concerning the presence or absence of pathogens. This fact has made progress in shellfish cleansing slow.

In the field of shellfish sanitation as in the field of water supply it has been necessary to use the laboratory report of shellfish examinations in a trial and error way. Not being able to get a definite answer to the question "Will it make the consumer sick?" it became necessary to depend on experience in the use of water supplies to find out. In this way there developed a kind of empirical formula for determining water standards. From experience it was learned that water coming from clean watersheds was safe. This fact later was tied in with bacteriological standards for water quality. Judging by standards applied in domestic water [2] supplies it could be assumed that shellfish coming from beds the water over which was of drinking water purity would be safe for consumption. Actually experience has demonstrated that this is so. However, if the taking of shellfish is confined only to areas where the water meets the Treasury Department Drinking Water Standards, many valuable beds at present in use would be lost to the industry. There are, moreover, stronger economic forces at play in the shellfish field than in the field of water supply. Water falls from heaven and is free. Shellfish must be grown, gathered, and prepared for consumption. This costs money. Moreover, they are not universally distributed as is water. They grow only in certain favored places. If we close growing areas unnecessarily you can be sure we will hear from business men, state legislators, governors, and congressmen. It is not as easy to enforce strict standards here as it is in the field of drinking water supplies. The regulatory authorities have therefore been guided by past experience with shellfish and have set up more lenient standards than those applying to drinking water. There is no precise knowledge of the possible further latitude which might be allowed without actually causing disease. It must be borne in mind, however, that the shellfish industry would suffer a tremendous financial loss if too much latitude were allowed so that a serious typhoid fever outbreak would result. Still the margin of safety between safe shellfish grounds and unsafe ones from a public health engineering standpoint should not be broader than is actually necessary to protect the public health.

Another problem that arises in connection with shellfish growing in waters of questionable safety is as to whether these shellfish can be safely consumed after having been passed through a shellfish cleansing plant. With how much contamination in the raw shellfish could such cleansing plants safely deal? Will such cleansing plants operate equally well when treating all kinds of

shellfish? Must a different method of examination be evolved for each kind of shellfish? The only way answers can be found to such questions, with our present lack of precise knowledge, is by the trial and error method; with human shellfish consumers in the rôle of guinea pigs. A little progress has already been made in this way. In England it has been shown that there is less typhoid fever among consumers of mussels which have come from moderately contaminated areas, and that have been passed through shellfish cleansing plants, than prevailed among the consumers of uncleaned mussels from the same areas. Similar experience is accumulating in this country with respect to soft clams.

An efficient laboratory method for determining easily and quickly whether certain shellfish would or would not probably cause illness if consumed would justify the establishment of definite standards for approval or rejection based only on the laboratory examination of shellfish. Such a method of examining shellfish—if one could be developed—would be direct and would be many times more valuable than the present method of seeking for circumstantial evidence of pathogenicity. It would justify the making of the statement that "limits of pollution could be given for oysters and oyster waters in the form of carefully phrased recommendations," whereas no real justification for phrasing such a statement on the showing of the laboratory report alone now exists. Not enough is known now concerning the degree of pollution to be associated with pathogenicity to make such a statement. It would be desirable to exclude from market all shellfish showing the presence of any organisms of sewage origin. Such a standard would, however, close nearly all the most valuable shellfish grounds in our waters from which shellfish have been marketed safely for years. It should be remembered in this connection that almost invariably when shellfish responsible for the cause of disease have been traced to their source they were found to have been gathered, stored, or plumped in shallow water or floats and near the shore where there was a short and direct connection between fresh sewage and the shellfish. In the present state of our knowledge, however, it would not be advisable to narrow the margin between contaminated but safe shellfish and contaminated unsafe shellfish. What is needed is more knowledge, not a reapplication of our present knowledge.

The shellfish report should state its findings in the most intelligible manner. To say that a sample of oysters scores 23, for instance, means little to the average scientist unless he has been working in the field of shellfish sanitation recently. It is in effect expressing the results in a code unintelligible to scientists at large and without much meaning to most sanitary scientists. To the man in the street it means nothing. The English methods of expressing results in terms of so many organisms per oyster is more intelligible. Likewise, the practice of examining the meats which are eaten rather than the liquor which is thrown away is to be preferred. Making meat instead of liquor examinations results in showing a larger number of organisms per oyster. In 86 pairs of examinations in which the meats were shaken up with sterilized shot and the resulting emulsion examined after the liquor had been examined as prescribed by *Standard Methods,* during the so-called hibernation period for oysters, the average number of organisms per oyster was 13 for the liquor examinations and 760 for the meats. This shows that not all of the contamination present in oysters is disclosed when examined by our present standard method.

In view of the very limited amount of information we get from the shellfish report we have been obliged to rely chiefly on our knowledge of bacteriological quality of the overlying water, the nature and degree of pollution entering the shellfish grounds, and the past record of shellfish coming from such areas with reference to the spread of diseases. These three factors have determined almost entirely whether or not a given shellfish area should be closed or be permitted to remain open.

There is a tendency now to attempt to differentiate between the organisms of fecal and of non-fecal origin. Should such a differentiation be practicable and be quick and simple in its application, it would still probably not change our present trial and error methods of differentiating between safe and unsafe shellfish areas.

Recently a good deal of work has been done in the isolation of *B. typhosus* from sewage, sewage sludges, and shellfish, following Wilson and Blair's methods or modifications of their methods.[3–8]

If a long series of reliable negative results for the presence of *B. typhosus* should become available for shellfish from shellfish cleansing plants, and if the consumers of shellfish from such plants should continue to be free from typhoid fever organisms, it would tend to confirm our confidence in the operation of such plants. The existence of such a test might disclose weakness in operation without having to adopt the more brutal method of having to wait for the development of typhoid fever among shellfish consumers. Until a simple method for detecting pathogens in shellfish is found we will probably have to continue to depend upon our present trial and error methods to determine the safety of shellfish grounds.

Any improvement in method of bacteriological examination of shellfish which will give more precise results will be an advantage, but not a great deal will have been gained until either a short, reliable and simple method of isolating pathogens will have been found, or until we learn something more about the degree of contamination to be associated with pathogenicity. We must still continue to use our old trial and error method with its unknown percentage of efficiency, but with its very definite effectiveness.

The nature of the problem makes it impossible to expect the development of any method which will permit a sharp line to be drawn between safe and unsafe shellfish if based only on the laboratory examination of shellfish. Pollution from sewers may be carried further by tide, rainfall, and wind today than yesterday; more pathogens may be present in the sewage tomorrow than today because of the presence of an epidemic, or the shellfish consumers may be less able to combat small amounts of infective material tomorrow than they are now able to do because of lowered physical resistance. There will always have to be a zone—not a line—between good and bad shellfish areas. More precise laboratory methods may make it possible to narrow the zone we now think necessary. Conclusions must continue to be the result of seasoned judgment and experience and must be formed in the light of all the information sanitary science can furnish.

Any method that gives us information concerning the contamination present in shellfish meats rather than in shellfish liquors will, it is believed, be more valuable than the present methods depending on the examination of shellfish liquors.

Some factors which would be helpful in our present state of knowledge are information concerning the relation between numbers of *B. coli* and of *B. typhosus* in sewage, in sewage contaminated waters, and in sewage contaminated shellfish. These are not

simple problems to solve, but if solved would supplement our present methods of arriving at conclusions in a very helpful way.

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Cincinnati Lays a Solid Foundation for Future Public Health

THE publication by the Public Health Federation of Cincinnati of a Study of Mortality in the city represents a significant step in building for the future. This volume of 200 pages, with 200 maps and charts, of course concerns Cincinnati most directly. But as a sample of good procedure for health councils, this publication deserves wider attention.

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Federal Control of Spray Residues on Fruits and Vegetables*

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THE spray residue situation has been a problem with the Department of Agriculture for the last 20 years. During 1915 and 1919 the department made a field survey of spraying practices, including analyses of the fruit ready for market. The result showed that where the spraying schedules recommended by the Bureau of Entomology were strictly followed the residues were present in amounts which, in the opinion of the department, in the light of information then available on the toxicity of lead and arsenic, would not be injurious to health.

In 1919 the Boston Health Department embargoed a shipment of western pears found to contain heavy residues of arsenic in the form of spray material, in some cases in amounts equivalent to half a medicinal dose on an individual pear. This served as a warning to regulatory officials that the insect horde was increasing, with a resulting increase in the use of insecticides. In a conference at Washington, called by the Bureau of Chemistry and attended by the fruit growers, it was recognized that steps must be taken by that industry to clean its products from excess residues before marketing.

The field force of the Bureau of Chemistry, which then enforced the Federal Food and Drugs Act, was directed to make a careful survey of the fruit producing areas, particularly those of the western states. This campaign was repeated for succeeding years, and instructions were issued to the shippers to remove visible spray residues from the fruit before shipment. Many shipments were detained by the federal agents and by coöperating state officials, and fruit found to bear excessive residues was to be cleaned before moving in interstate channels.

The department at that time was confident that where strict adherence to spray schedules was the rule, thorough wiping of the fruit before shipment would constitute a competent safeguard. To meet the ever increasing insect infestation, growers not only resorted to more intensive application of sprays but employed so-called binders, casein or oil, to make the spray more effective. Our analyses disclosed that ordinary wiping would not adequately remove the residue where binders had been used. We found that in many instances the removal of all visible residue was not tantamount to a thorough cleaning. The department then, in coöperation with state experiment stations, undertook to

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devise better methods of cleaning, and through the Bureau of Chemistry there was perfected an acid solution for washing the fruit, for which a public service patent was secured in 1926. The Bureau of Plant Industry, another bureau of the department, had developed suitable mechanical equipment for washing.

About this time, or in 1925, the British press reported illness due to the consumption of American apples, and Great Britain served notice that in view of the high residues found, American fruit would not be accepted unless it conformed to the limits for arsenic established by the British Royal Commission which investigated the Manchester beer poisoning cases at the beginning of the century. That limit, frequently known as the international tolerance, is 0.01 grain of arsenic trioxide (As_2O_3) per pound of solid food.

Through the coöperation of the industry with state and federal officials, an export certificate plan was devised for large producing states of the West. This plan, which is in effect today, involves the employment of field analysts whose qualifications are passed upon by competent state and federal chemists and whose salaries are paid by the industry. Every export shipment contains a certificate of analysis showing the fruit to comply with the established tolerance. The fruit is also graded by the Bureau of Agricultural Economics of the department. During the year 1934 the Northwest examined 68,555 samples of apples in 35 privately established laboratories. Incidentally, the number of seizures of this certificated fruit is practically negligible.

At this time (1925) the department, still through the Bureau of Chemistry, undertook aggressive regulatory action; in fact, seizures had already been made prior to Great Britain's action, which was given some publicity in the metropolitan press. One of these was a carload of western apples consigned to the Chicago market. The claimant elected to contest the issue in the federal court, and so it became necessary for the government to introduce testimony as to the harmfulness of the fruit involved. Medical experts testified for the government, among them Dr. A. J. Carlson of the University of Chicago, and Dr. J. C. Geiger who represented the Chicago Health Department. The testimony of the experts was unanimous in declaring that such fruit would be harmful to those who ate it and the government received a verdict in its favor. This was probably the most bitterly contested spray residue case which the government has had to prosecute, and it gave assurance to the officials of the department that their course was a wholly proper and not an arbitrary one as had so frequently been alleged by fruit growers and other opponents.

In spite of the verdict in the trial at Chicago and the fact that the department had been guided in its administrative course by the advice of public health officials, as well as by the data obtained by the British Royal Commission, the department undertook to seek further advice through a committee of experts in view of the progress which had been made in the study of the effect of small amounts of toxic substances. This board of experts, consisting of Dr. Reed Hunt of the Harvard Medical School as chairman, and of such men as Dr. Carl Alsberg of Stanford University, Dr. Carl Voegtlin of Public Health Service, the late Dr. A. S. Loevenhart of the University of Wisconsin, Dr. Frederick B. Flinn and Dr. Haven Emerson of Columbia University, met in Washington the early part of 1927. At the conclusion of its deliberations, the committee advised the department that it regarded lead as the more significant of the two elements in arsenate of lead, the insecticide commonly—almost universally—applied to combat the codling moth. The department, therefore, un-

dertook to compel an observance of a tolerance in terms of arsenic which would also insure a safe product so far as the lead factor was concerned, based on the premise that in the commercial arsenate of lead the ratio of lead to arsenic is approximately 2½ to 1. It later developed as a result of numerous analyses that not in all cases was this ratio maintained; cleansing processes were not equally effective in removing both lead and arsenic. A quick and accurate method for determining lead was needed.

The Food and Drug Administration, which in 1927 took over the enforcement of the Act originally assigned to the former Bureau of Chemistry, undertook a study of lead determination, since no rapid and reliable method was available. In 1933 a method both accurate and speedy was developed, making possible a lead determination in 30 minutes where formerly 3 days had been required.

In 1933 the department first announced a tolerance for lead in addition to one for arsenic, and the announcement for 1935 fixed the tolerances at 0.01 grain per pound for arsenic, at 0.018 grain per pound for lead, and at 0.01 grain per pound for fluorine.

The number of seizures and prosecutions which have resulted from enforcement of this provision of the Act is impressive and to a degree discouraging. For example, during the fiscal year ending July 1, 1935, there were 338 seizures of fruits and vegetables containing excessive spray residue, and of these 299 were apple shipments, showing the importance of this commodity from a regulatory standpoint compared to all other fruits and vegetables.

To explain further what is meant by a discouring outlook, we find that in 1933 there were 137 seizures of apples and only 34 in 1934. In the 1934 report of the Food and Drug Administration is this significant statement:

> Since interstate shipments alone are subject to regulation under the Federal Act, the public will never be entirely protected as long as poisonous sprays are applied until all state authorities exercise the same degree of effective surveillance that is now maintained in some states.

While the Food and Drug Administration gratefully acknowledges the effective coöperation and assistance received from state and city food control officials, nevertheless the statement quoted should be given serious consideration.

Throughout our campaign, we have not been entirely happy to note a reluctance on the part of some state officials to require the observance of a tolerance for the intrastate distribution and sale of sprayed fruits and vegetables. A number of apple producing states in the East as well as in the West have taken every precaution to safeguard the health of their citizens through an insistence upon compliance by the growers with the tolerance announced for interstate shipments. Such action has been of tremendous value to this administration in its control program. Our only regret is that not all of the states have adopted similar measures. We know that state budgets have suffered, but there has been evident no general disposition on the part of state officials to issue a warning to the industry or to declare a tolerance for intrastate commerce. In fact, in one or two instances we know that responsible officials have declared to the industry that cleaning would not be required for sale and distribution within the state. While it is distinctly contrary to the Food and Drug Administration and to the Department of Agriculture to criticise the administrative policy of officials of sovereign states, we feel it is entirely proper at least to make a simple statement of fact, particularly when the health and welfare of the public is at stake. Assuredly it does not seem unreasonable to assume that every health and food official, every guardian of the

public welfare, should exercise all power at his command to safeguard the health of the people.

We realize too that state chemists as well as our own analysts have been handicapped until recently by lack of a satisfactory, quick method for determining lead. Now that a dependable method is available taking only 30 minutes of the chemist's time, we hope that there will be increased activity along this line; in fact, it is already evident in some of the state reports. Incidentally, it may be pointed out that a sample which complies with the tolerance for lead will be well within the limit for arsenic, except of course in those unusual instances when such insecticides as calcium arsenate are used.

The Federal Food and Drugs Act contains no specific reference to lead, arsenic, or other toxic substances. It does, however, contain a provision with respect to adulteration and the language of one particular paragraph declares that food is adulterated if it contains any added deleterious substance which "may render it injurious to health." A Supreme Court decision pointed out that food may be consumed by the strong and the weak, by the healthy and the sick, and if there is any possibility of injury to health the product comes within the ban of the statute. The tolerances which the department has announced from time to time have not been arbitrarily fixed but have been issued only after long, careful study by those competent to judge. They have been established in the light of modern toxicological thought which now recognizes unlimited potentialities for harm in the ingestion of minute amounts of arsenic and lead. This phase of the problem, however, is for presentation by others who follow on this program.

The important point for us to consider is the magnitude of the problem which faces regulatory health and food officials. The crop of apples this year will exceed 75,000,000 bushels, much of which will move interstate by truck shipment, especially in the central producing area. The fact that vastly more shipments were seized in 1934 than the previous year shows that the industry as a whole has not yet recognized the seriousness of this problem and the importance of thoroughly cleaning fruit before marketing. The Food and Drug Administration for several years has been spending one-third of its entire appropriation, or nearly $500,000 for this project alone, obviously one of vital concern to public health.

Lest the impression prevail that our outlook is too pessimistic, it should be recorded here that developments already during the 1935 harvest are distinctly encouraging. For example, recently 2 states, 1 in the East and 1 in the Midwest, have perfected plans, in coöperation with the Food and Drug Administration, for state control and certification of outgoing shipments. Expenses are to be defrayed in part by the industry, and in return the growers are to receive preliminary orchard service to determine the extent of cleaning necessary, followed by the analysis of each lot intended for shipment. If the sample is found to be within the tolerance, a state certificate showing this fact will be issued. Coupled with this plan is the announcement by regulatory officials of both states of their intention to warn the industry that sales within the state will be required to meet the same tolerance as those intended for interstate commerce. Rigid execution of this plan will result not only in a minimum of federal seizures, or no seizures, but increased protection to the citizens of the respective states.

Another interesting development is the passage of the first state laws designed to control the spray residue situation—in Colorado and Michigan. The operation of these laws will be

watched with particular interest not only by other states, which may in turn adopt similar measures, but by the Food and Drug Administration in anticipation of increased effectiveness in eliminating toxic spray residues.

This paper has dealt with arsenate of lead as the insecticide and with apples as the important commodity. At present arsenate of lead enjoys extensive use and, according to our information, is regarded by entomologists as the most effective weapon against the codling moth. Apples are the chief problem because of the size of the crop and the almost universal need for spraying. The department has had occasion from time to time to take action against other fruits and vegetables for excessive spray residue—pears, cherries, currants, celery, cabbages, cauliflower. These last 3 vegetables have in turn represented individual problems, but at present through intelligent use of proper insecticides and adequate cleaning methods, seizures are few and far between, although a number of seizures of broccoli were made during the year.

Research is going forward within the department, and independently, with the hope of discovering a substitute for arsenate of lead which will be equally effective against insect pests and less poisonous to man. Ambitious salesmen have endeavored to convince fruit growers of the relative harmlessness of fluorine compounds, but apparently the entomologists are not in agreement that this is an entirely satisfactory substitute insecticide. Furthermore, the researches in Arizona and elsewhere have shown the peculiar effect of small amounts of this element in the mottling of tooth enamel. In view of its distinctly toxic properties the department has issued a tolerance equivalent to that for arsenic. Some experimental spraying has been done with compounds of selenium as well as with compounds of mercury. It is doubtful, however, in view of the extremely toxic character of the compounds of these elements whether any commercial development will arise along these lines; certainly, the Food and Drug Administration will continue to exercise due vigilance in excluding from the market products which have been treated with these dangerous chemicals.

SUMMARY

The spray residue situation has been a problem with the Department of Agriculture for 20 years and its various bureaus have used their resources for research, for education, and for correction through regulatory measures. They will continue to do so. As a result of its endeavors, the Food and Drug Administration feels warranted in saying that the fruit and vegetable crop which moves in interstate commerce is practically free from toxic residues. We shall not be entirely satisfied, however, until, with increased recognition and supervision on the part of state food and health officials, we can say with confidence that all of the fruit and vegetable crop which has been subjected to spraying is entirely safe for human consumption.

State Control of Spray Residues*

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WITHIN the past few years the control official has recognized the acquirement on the part of the consumer of a public health attitude which is significant. We have come to a realization of the acceptance on the part of the public that their health, welfare, and general interest, as well as their pocketbooks, are being adequately protected by those charged with this responsibility. Have we not, as control officials, been too complacent in accepting our program of enforcement which has increased in efficiency since the early years? I am thinking in this connection of the spray residue situation which prevails generally in producing sections of the country.

In approaching this problem originally, the attitude of those in a position to know its significance realized full well the seriousness of this question; that we were confronted with an unusual condition. Science had already furnished the weapons for controlling insect pests in the shape of poisons, coupled with a policy and practice on the part of the producer of applying such materials in an effective way; but the public generally had not been fully advised, or adequately informed of the potential dangers from the continued use of small quantities of poisonous materials.

The means resorted to, led particularly by the federal control officials, in working on an educational basis with just sufficient regulatory action to impress industry of the seriousness, appeared to be the only procedure that could be followed.

Unfortunately, the state control officials in the producing areas, split up in factions as they were, or influenced to a large extent in restricted areas by the attitude of entomologists, horticulture departments, and experiment stations, retarded the acceptance of a program. Control officers who, after all, must stand the brunt and criticisms of enforcing regulatory laws, in many instances did not appreciate the seriousness of the threat to public health, and for that reason were slow and reluctant to put into effect measures within their authority and jurisdiction that would tend to correct conditions.

The consuming public has been the last to be informed as to what this means, because of the well grounded fears of those in authority that they might become unduly alarmed, and industry suffer materially because of their refusal to accept questionable products freely.

Regardless of fears, as the past few years have taught us, I sometimes question whether we are justified in following continually this policy. The success of the enforcement of regulatory laws depends fundamentally and basically on public support and understanding. When public support is lacking,

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there is opposition; obstacles are placed in the way; moneys are not appropriated adequately and competent forces to cope with such conditions are not provided for in many places. As state officials, many of us are face to face with this situation in our localities, in attempting to control the intrastate movements of fruits and vegetables that contain dangerous substances in amounts beyond that which are considered normally safe. I am convinced that the conditions prevailing in the states, the absence of definite policies on the part of state control officials, have seriously hampered and retarded the progress for the control of interstate shipments.

It is pertinent to point out that a survey made in several states of programs in force for the control of spray residue will show a woeful lack of appreciation, as well as of definite action and policies along control lines.

We shall find, however, that a movement has been started, and will probably continue to grow and develop, in assisting industry to meet this problem by providing service features which enable the grower to determine conditions prevailing at the time of the harvest of fruit.

I believe we can appreciate what it means to industry to have such features available. On the other hand, it should be apparent that a definite regulatory enforcement program should be carried out in connection with the service features which have been inaugurated in some states.

Coupled with a definite program of enforcement should also run parallel a definite informative policy that would clearly point out to the consumers and to industry the seriousness and the purposes behind control measures, and in this way gain public support in any endeavor for corrections. The thought is that this practice would go a long way toward stimulating confidence in control officials and their action, which would enable them to accomplish more than they otherwise could do.

A program for controlling interstate shipments of fruits and vegetables containing excessive quantities of dangerous poisonous substances could well be developed along the following lines:

1. Information should be developed from all sources pertaining to the necessity for regulating this condition; the advantages in following such a plan; the protection that would accrue to those engaged in production; in the handling or merchandising, and in the consumption of such items; just how such a program would affect the producing industry and the distributors; and this information given the widest publicity on the basis of the fact that it is logical, sound, and in the interests of the community.

2. The support of the medical profession, public health officials, agricultural colleges, experiment stations, entomologists, and other organized groups who have the interests of industry and the public at heart.

3. A carefully planned enforcement program, so developed and worked out that it will be practical, inconvenience industry as little as possible, and at the same time be effective, and compulsory in that every shipper and all movements of fruits and vegetables likely to be contaminated will be subject to the same control features.

Such a program should then be given the widest publicity in order that the industry could prepare itself to comply with any and all reasonable demands made upon it.

4. To those control groups in producing areas where facilities are not available which would enable the producer to determine the condition of his fruits and vegetables at the time of harvest, service features could be provided for by establishing control stations, chemical laboratories, and technical services at a nominal cost to industry which would be purely of an informative character but carefully segregated from enforcement features.

A general plan such as outlined, if made uniform in adjoining states and correlated carefully with the interstate shipment of fruits and vegetables, would exact the same compliance from all parties concerned, and because of its obvious fairness there would be no criticism as between one group, or one

state, and another. Until such a program can be developed, I can see no permanent solution of this problem.

The State of Michigan, this problem being of an acute character, has endeavored to follow to some extent the above plan. There have been established service laboratories and inspection stations throughout the producing areas which provide for the examination of fruits and vegetables for the producers at a nominal cost, and when it has been determined by the producer that his fruit is in an acceptable condition for marketing, he may request an official collection of representative samples for analysis, and, upon finding that tolerances established have not been exceeded, the state will then furnish a certificate identifying that lot of fruit and indicating that representative sampling indicates that it is not in excess of the tolerance and is, therefore, acceptable on the market.

There are a number of other features that are being worked out in connection with the service program of the state which ultimately, we believe, will be of benefit to both the consumer and producer.

There is also being inaugurated a definite state control of intrastate movements with the object in view of preventing the inter-city movements of fruits and vegetables containing residues in excess of established tolerances.

A Move in the Right Direction

". . . Fortunately, General Reynolds, the new Surgeon General, has the breadth of vision to recognize the fact that the medical professions comprising the various Corps making up the Medical Department of the Army have their own professional standards and problems that are peculiar to each service and that they should be in charge of their own officers under the supervision of the Surgeon General, as Chief, who represents all the Corps comprising the Medical Department.

Accordingly, Surgeon General Reynolds issued an order, under date of November 29, 1935, discontinuing the Veterinary Service as a subdivision of the Professional Service Division. In the future the Veterinary Service will function as the Veterinary Division of the Surgeon General's Office."—*J. Am. Vet. Med. Assn.*, Feb., 1936, p. 113.

Pharmacology of Small Quantities of Lead and Arsenic*

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ANEMIA and pallor, lead line of the gums, painful intestinal colic, injuries to the nervous system, kidneys, and liver, and a train of other symptoms follow prolonged intake of minute amounts of lead or lead compounds. This makes it necessary to see to it that solutions or sprays containing lead do not leave enough of the lead upon the fruits or plants to cause chronic poisoning even in persons who may eat a great deal of unwashed fruit over months or years. This quantitative aspect must be further emphasized because of the great variability in tolerance to lead in man as seen in mass poisonings and in examinations of workers exposed to similar conditions in the lead industries, and because of the very limited increase in tolerance that one may expect in man.

One must also keep in mind that fruits are particularly the food of the sick and infirm who have had their factors of safety lowered by infections or organic disease, and that they are consumed by alcoholics and by persons who have had their strength sapped by poor hygiene and inadequate diets. Moreover, whatever lead one may absorb and store through eating lead sprayed fruits is added to the lead intake from other sources; that is, other foods, street dust, street and garage vapors (ethyl tetra lead), certain drinking waters, etc. In the tens of thousands of workers who come into closer contact with lead through the several hundred branches of industry in which lead is being used in one form or another, the addition of lead from sprayed fruits may be especially significant. The estimates of the minimum daily intake of lead necessary to produce distinct plumbism vary with the investigator and the time necessary to show the symptoms of poisoning. As examples, the estimate by Sollmann is a daily ingestion of 10 to 20 mg. to produce severe poisoning, and by Gaertner 4 to 7 mg. daily to do so within a few months. Others have placed the values as low as 1 mg. per day. Naturally, with higher doses the effects are much more prompt and severe.

Chronic arsenic poisoning resembles that of lead with its gastrointestinal catarrh, liver damage, impaired nutrition, and neuritis. In regard to the probability of chronic arsenic poisoning, contacts with arsenic in daily life are frequent owing to its use in cosmetics, Paris green, poisons for flies and vermin, etc. However, the usual artificial coloring of arsenic warns one against its dangers, and arsenic in wall-papers in general has been reduced

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to traces. Though arsenic is toxic in milligram doses and is widely distributed in water, coal-smoke, wine, salt, and so on, which give rise to traces in the human body, the usual intakes from such sources are not proved to be injurious. Although fruits after being sprayed, *e.g.*, with lead arsenate, retain this rather tenaciously, traces retained after ordinary washing would probably not be clearly harmful as to the arsenic, though the same general considerations hold as in case of lead. There is, however, this important difference—that a very considerable tolerance to arsenic may be built up, so that several times the quantity that would be severely toxic as an initial dose of arsenic may be taken later with apparent impunity.

The complete pharmacology of small quantities of lead, and of arsenic, taken for long periods has not yet been written. It is usually assumed that ingestion of lead below the amounts producing distinct lead poisoning is non-injurious. Future research is likely to prove this assumption invalid.

Camp Permits Required in Maryland

NEARLY a hundred tourist camps are operated in Maryland, according to a recent check-up of permits granted last year to owners or operators of camps and recreation grounds by the Maryland State Department of Health. The total number of camps which met the sanitary requirements, and which were duly posted after inspections by the county health officers, or the Bureau of Sanitary Engineering of the State Department of Health, was 167. Included in this total were 93 tourist camps, 49 recreation camps, 1 labor camp, 3 that were used for religious exercises, and 21 picnic grounds.

In preparation for the coming season, Dr. R. H. Riley, Director of the State Department of Health, has notified camp owners or operators of the sanitary requirements which must be met before the camps may be opened. No camp, whether new or old, may be operated without a permit; permits do not hold over from season to season. The state regulations apply to any premises used as a camp or picnic ground for a period of 6 days or longer, and accommodating 10 or more persons.

Spray Residues*

From the Viewpoint of the State Health Officer

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THE problem in Montana of spray residues has been largely concerned with those fruits or vegetables being shipped into the state rather than those grown within the state. Production of vegetables on a commercial scale is confined for the most part to a few truck farms near the more populous centers or to production for canning. The vegetables canned on a commercial scale in Montana are not such as to require use of poisonous sprays which leave residues in amounts capable of causing injury when used for human consumption.

In the summer and fall of 1932 Montana was hit with an epidemic of roadside fruit and vegetable stands. During a survey of the sanitary conditions around these establishments it was observed that a number of different kinds of apples and some pears were fairly well coated or were heavily spotted with some foreign material. Samples were collected and examined in the laboratory for suspected spray residues. All samples suspected of carrying excessive spray residue were found to exceed greatly the federal tolerance. These roadside stands were quite widely distributed but concentrated around the more populous communities. Because of the cumulative effect of arsenic and the menace it would become to any community where an appreciable amount of this fruit might be eaten, the State Board of Health believed some concerted action to control the situation was necessary, since the fruit had been brought into the state by truck.

A conference was held in Spokane with the Chief of the Seattle Station of the Federal Food and Drug Administration. As a result, a chemist and inspector from the Seattle Station were sent to Montana and worked with us for 3 weeks, sampling, analyzing, and instituting federal action against all interstate shipments found exceeding the federal tolerance for spray residue. After the federal men left, this work was continued in full force by the State Board of Health.

The Montana State Horticultural Department had already established stations, or so-called ports of entry, at various points near the Montana line on the principal highways to check fruit and other produce for insect infestation, grades, and labeling. Thanks to the very hearty coöperation of the Horticultural Department, we were able to establish an extensive sampling program of all trucks bringing produce into the state. In addition to these ports of entry the Horticultural Department also had, in all of the principal cities, inspectors whose duty it

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was to check all rail shipments of produce.

By the time this sampling program was established it was found that rail shipments of fruit were as badly adulterated as truck shipments. This resulted in the adoption by the State Board of Health of a regulation requiring all shipments of fruits or vegetables into Montana to be accompanied by a competent certificate certifying the product to be within the federal tolerance for spray residue.

Samples collected by the inspectors were forwarded to the State Food and Drug laboratory for analysis. All shipments found to exceed the tolerance were ordered held until washed or otherwise treated to bring them within the tolerance, or else were ordered destroyed. Samples of rail shipments, where interstate shipment could be established, were taken and submitted to the federal authorities so that federal action could be instituted against the shipper.

In some instances in this 1932–1933 drive it was found that where some rail shipments were accompanied by a certificate with three or four varieties of apples in the same car, one or more of the varieties would exceed the tolerance. This made us rather skeptical of those first certificates. As a result, our sampling campaign was carried on regardless of whether or not accompanied by a certificate.

A brief summary of the work of that season is of interest:

No. of Boxes Represented by Samples				
Oct.–Nov.	*Dec.*	*Jan.*	*Feb.*	*Mar.*
37,000	15,600	21,000	15,500	11,000
Per Cent Bearing Excessive Spray Residue				
20	15	2.4	12	13

Prior to the 1933–1934 shipping season, the Montana regulation requiring certificates was given considerable publicity both in Montana and in Washington. We also declared ourselves ready to continue our sampling campaign and to take action against all shipments exceeding the federal tolerance.

About that time the State of Washington established a system of packing-house supervision. Each lot of fruit as it went through the washers and was packed was given a lot number. Each lot was sampled and analyzed for spray residue. All lots found exceeding the tolerance were required to be rewashed and brought within the tolerance before they could be sold. As a result there has been practically no trouble with excessive spray residue fruit in Montana since the fall of 1933.

SUMMARY

From the large amount of apples and pears found on the Montana market in the fall of 1932 we believed Montana was being used by some out-of-state fruit growers or shippers, as dumping ground for those fruits exceeding the federal tolerance for spray residue. Through coöperation of the Federal Food and Drug Administration and the Montana State Horticultural Department a sampling campaign was instituted and all fruits found exceeding the tolerance were destroyed or held until satisfactorily treated to bring them within the tolerance. A regulation was passed requiring that all fruits and vegetables shipped into Montana be within the federal tolerance for spray residues and carry a certificate that such produce did comply. Shipments without certificates could at the discretion of the inspector be refused entry or ordered held until an analysis could be made. Local fruit dealers were first inclined to object, but after the death of a 15 year old Billings girl in the spring of 1933, attributed to arsenical poisoning from eating spray-residue-bearing fruit, no more complaints were received about our campaign against such fruit. We

are still carrying on, and again this year have the entire coöperation of the Horticultural Department, and whenever interstate shipments are found exceeding the federal tolerance, samples will be submitted to the federal department so the shipper may be prosecuted.

We believe we have eliminated, so far as possible with the funds and personnel available, this danger to the health of the people of Montana.

Dr. Arthur J. Cramp

WE regret to announce that Dr. Arthur J. Cramp, for 29 years the head of the Bureau of Investigation of the A.M.A., has resigned because of ill health.

The medical profession owes much to him for his relentless fight on quackery. He developed the Propaganda and Reform Department of the A.M.A., which is now known as the Bureau of Investigation.

This Association and our *Journal* owes much to Dr. Cramp, as he was always liberal with his time and advice concerning advertisements and irregulars who approached us. His *Nostrums and Quackery* is known practically all over the world. It is now undergoing its revision for the third edition.

Dr. Cramp was born in England, and came to this country at the age of 19. He graduated in Medicine at the Wisconsin College of Physicians and Surgeons, in Milwaukee, but soon gave up practice and became a member of the staff of the A.M.A. We wish for him all good things in his retirement and as great a degree of health and happiness as is possible. M. P. R.

Poisonous Substances in Food, Particularly Spray Residue on Fruits and Vegetables*

From the Point of View of the City Health Officer

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THE subject of food poisoning, whether chemical or bacteriological, is an ever increasing and troublesome problem to health officers. In the course of the investigation of any and all food poisoning outbreaks, health officers should be alert to the possibilities of chemical poisoning. A list of the better known mineral chemical poisons that not infrequently are found in the responsible food, introduced unintentionally or inadvertently in the process of manufacture or preparation, includes arsenic, antimony, lead, zinc, copper, and possibly tin and aluminum, at least under certain favorable circumstances.

A celebrated epidemic of "peripheral neuritis" which occurred in England in the latter part of 1900 was traced to the presence of dangerous quantities of arsenic in beer. Approximately 6,000 persons were affected, and some 70 deaths resulted. The arsenic had its source in sulphuric acid used to hydrolize the starch to make glucose and invert sugar.

Lead is a familiar and dangerous poison, and repeated exposure has long been recognized as a serious public health hazard. Despite the publicity given to the danger of the use of lead piping in water supplies, especially when these supplies are chlorinated, we still find lead service pipes in use in some of our American cities. The recent occurrence of lead poisoning in a number of steel workers employed in the erection of one of the San Francisco Bay bridges was found to be partially due to ingestion of lead with cold lunches. The noonday meal was usually consumed on the job, and there were no washing facilities available.

Food products received in interstate commerce are subject to the scrutiny of the Federal Food and Drug Administration Inspection Service. It is generally agreed that this service is an efficient, indispensable adjunct to state and local public health activities. Federal supervision is not applicable to those foodstuffs entering only intrastate traffic and commerce, but the courteous coöperation extended by this branch of the federal government to local authorities is always of material assistance in state and local food problems. In a number of instances the seizure and condemnation of locally manu-

* Read at a Joint Session of the Association of Dairy, Food, and Drug Officials and the Health Officers and Food and Nutrition Sections of the American Public Health Association, at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 9, 1935.

factured products have been due to the continuous contact maintained between the district office of the Federal Food and Drug Administration and the Department of Public Health of San Francisco.

Poisoning from consumption of fruits and vegetables containing spray residue presents a problem to the public health official. In the endless battle against insects, fruits and vegetables are sprayed or dusted with insecticidal agents which remain in varying amounts as residue. Unless such residues are removed, the foods reach the consumer carrying quantities of toxic substances which are seldom large enough to cause acute poisoning, but which, over a period of time, may lead to a definite impairment of health due to the cumulative effect.

Since acute poisoning due to the spray residue is not frequently encountered, and since chronic cumulative effects are produced, sometimes even after years the public health aspects of the spray residue problem become a subject of practical importance. It is important because of the definite possibility of mass poisoning, and equally so because the very nature of chronic poisoning is such that it is often difficult, if not impossible, to connect the end result with the causative agent.

Because of the obvious economic and practical importance of food to our welfare, the protection of various fruit and vegetable crops, through the development and application of suitable insecticides particularly, has become a problem of great magnitude. In these control measures against the plant and insect parasites, however, we are confronted with a dual problem: (1) there is the necessity for an efficient insecticide; and (2) we are faced with the public health problem which requires the use of an insecticide uncomplicated by a health hazard.

To attempt complete or partial prohibition of those insecticides in use at present, most of which contain substances toxic to the human organism, would be impossible. Agriculturists and insecticide manufacturers are in a position to propound seemingly sound and convincing arguments against such a move. Some farmers and fruit growers insist that there is no danger whatsoever from these metallic sprays, and demand evidence of death attributable to the residues therefrom. These individuals rely, of course, on the fact that the poisoning is not of the acute but of the chronic type. Growers, in the majority of instances, do not appreciate the dangers of cumulative poisoning.

The solution of the dual problem requires the thorough pharmacologic investigation of all newly discovered or proposed insecticides from the point of view of toxicity to man, regardless of high insecticidal efficiency. Continued research to replace insecticides dangerous to man by materials less dangerous is of the utmost importance. Meanwhile, the public is being exposed to potential health hazards which must be minimized by continued and even more rigorous enforcement of control measures.

Proper tolerance limits for spray residues containing the various agents now considered hazardous must be maintained. The setting of tolerance limits for such toxic agents as lead, arsenic, and fluorine compounds does not entirely guarantee the complete absence of health impairment in the population. This is exemplified by a recent incident in a large city in California. An Oriental grower shipped a truck load of cauliflower to the open market where it was placed on sale. Inspectors became suspicious of the vegetable and took samples, which were found to contain 15/100 grain of arsenic and 4/10 grain of lead per pound, or respectively 15 and 20 times the tol-

erance limits allowed by the United States Government. The alertness of inspectors prevented the sale and consumption of this particular lot, but the fact remains that farm produce does filter into our markets containing large amounts of dangerous spray residue, and one can safely assume that a certain number of similar shipments probably escape detection many times each year. Farm produce entering intrastate commerce should receive more serious consideration, and goods sold directly from producer to consumer should be given closer inspection. This practice should be particularly followed in the case of markets maintained by farmers on well traveled highways in close proximity to metropolitan areas and catering to the motoring public.

The relationship of insecticidal residue to the public health in its various aspects is not always easy to establish by means of experimental evidence, but attention may be drawn to certain possibilities which will indicate the inherent complications and difficulties. The toxic effects of materials such as lead and arsenic may be additive if not synergistic. One chemical agent may increase an individual's susceptibility to another chemical agent. Such chemical agents may not directly interfere with growth, longevity or health, but may lower efficiency and resistance to infection and predispose to disease. They may be the cause of disturbing subjective symptoms. In some cases the agents themselves actually cause specific disease states; as, for instance, the palsies produced by lead and the dental defects produced by fluorides. Definite scientific proofs of such defects may be difficult to establish but they are potentialities that deserve consideration.

Sufficient data exist on chronic intoxication of various kinds to indicate that the public health hazard involved in the use of insecticides is worthy of the most serious attention. We cannot wage a battle against the insects with utter disregard of the effects of that warfare on man.

The Philosophy of Epidemics

NOTHING is worse for a community than long periods of apparent freedom from the endemic infections, though some people consider this as evidence of good public health administration. I have said on many occasions that a periodic epidemic of scarlet fever of the mild type which has been universal for the last decade is distinctly favourable for the health of a population, and I shall maintain further that periodic prevalence of the endemic infections at short intervals is highly desirable, for symbiosis between man and his endemic parasites is persistent and unalterable, and unless the communal immunity is kept up by continuous activity of the parasites, the field in which they work when they are introduced is highly detrimental to the hosts.—Dr. Dunstan Brewer, Swindon. —*Pub. Health,* Jan., 1936, p. 159.

DISCUSSION

FRED W. TANNER, PH.D.
Professor of Bacteriology, University of Illinois, Urbana, Ill.

ANY discussion which involves the use of the term "poison" will lack precision because of difficulties of definition of the term. Substances which are poisonous in the usual sense in certain concentrations become innocuous and even stimulants in lower concentrations. Preservation and conservation of foodstuffs according to present-day methods make it difficult to keep them absolutely free from foreign substances. Some of the latter are of little public health significance in themselves but others, such as certain heavy metals and metalloids, have caused some concern.

The interesting papers which have been presented in this symposium have discussed the significance of lead and arsenic on fruits and vegetables from the viewpoint of federal, state, and city health officers. We have not heard the viewpoint of the grower or horticulturist. These health officials who have spoken, however, are familiar with the serious problem confronting the producers and are sympathetic with the economic considerations necessitating these practices which ultimately may affect consumer health in an adverse manner. While there can be no compromise as far as public health is concerned, we should, nevertheless, keep the fact clearly in mind that spraying practices are employed by producers in the control of worm and insect infestation of their crops, not by malicious intent, but purely from the standpoint of practical expediency. Further, it should be remembered that crop failures due to pest infestation have decided economic bearings, not only upon the producers, but also upon the consumer, by virtue of the fact that short crops invariably cause higher retail food prices. For families or persons in limited circumstances, such a situation can conceivably have a distinct bearing on the plane of nutrition on which they are able to maintain themselves.

To complicate the problem further, it would appear that the consumer, as well as others interested in safe fruit and vegetables, might have to choose between products sprayed with insecticides and a very limited crop (if any at all) of unsprayed infested products. In either case, food and drug control officials are required to seize and condemn the products. I am informed that federal officials are just now greatly concerned over the presence of worms and insects in tomato products. Such contamination is just as objectionable in other vegetables as in fruits. Unfortunately, the best method now available for prevention of infested vegetables or fruits involves the problem of possible health hazards to those who consume these foods.

In view of these facts, the problem appears to resolve itself into:

1. A search for insecticides which are poisonous for insects but not for human beings when consumed in amounts which might be found on foods such as apples, for example. Agriculturists would gladly turn to other substances than lead arsenate if they could be proved to be equally effective. As far as the speaker knows, no such substances have been found. They may be found in the future. For instance, nicotine while somewhat satisfactory, has not given results equal

to those obtained by lead arsenate. While some organic compounds, notably rotenone, have given some promise, they have not been developed to the point where they may be considered as reliable as the arsenates because of certain chemical characteristics.

2. Selection of spraying schedules which would leave only small residues of lead and arsenic on the sprayed crops.

Spraying schedules have been determined largely in the past by the number of broods of insects which must be destroyed. Cost of the poison and expenses of application have in general prevented unnecessary treatment but this has not always been the case. In the section of Illinois from which I come, apples are sometimes sprayed 7 times in a season and further south they may be sprayed 10 times. The last treatment may be given only a month before the crop is harvested. Such apples carry very considerable quantities of arsenic and lead (*e.g.*, 0.25 to 0.50 grain Pb and 0.10 to 0.25 grain As_2O_3 per pound).

3. Development of methods of washing which remove lead and arsenic residues to values below the amount within the stated federal tolerance.

4. Abandoning orchards or fields in areas where spraying schedules require application of lead arsenate very late in the growing season.

Before this problem can be solved to the satisfaction of the various groups which are interested, the following points must be considered:

1. Whether or not cases of poisoning have actually occurred from the ingestion of foods, apples in particular, which have been subjected to proper spraying schedules and subsequently given a washing treatment. There have been no cases of chronic lead poisoning in spite of large residues of lead arsenate which have been found on apples.

2. The types of methods which should be used to determine the amounts of toxic metal contamination on sprayed and/or washed foods. The literature indicates some evident differences of opinion on accuracy of results secured with certain methods employing varied principles for the determination of the metal in question. This situation should be settled by a comprehensive investigation using standard samples.

3. The methods of sampling should be such as to give not only a cross-sectional sample but also accurate history of truck and carloads of fruits and vegetables.

4. The rate at which these metals are absorbed and the effect of the rate at which food passes through the alimentary tract on absorption, should receive further study.

5. The animal species to be employed in toxicological studies should be decided upon with particular reference to the degree to which results on test animals can be translated to human cases. The advisability of the use of human volunteers should receive some consideration, as well as the type of test to which humans might be safely subjected in order to obtain significant data on the health hazard of spray residues.

6. The efficacy of home preparation methods on reduction of the spray residue hazard should be given consideration.

7. The adequacy or inadequacy of the present tolerances for lead and arsenic should be investigated. Such tolerances should have some relation to the amount which would cause illness when the food is eaten. This phase has not been investigated to my knowledge. Experiments in which food containing amounts of metal on both sides of the tolerance fed to human beings, if possible, might yield much valuable information. There should be accurate data on which an acceptable tolerance could be based.

8. The extent to which the metallic components of sprays may be absorbed by way of root or foliage and appear within the fruit or vegetable tissue by virtue of metabolic processes of the plant, should receive further study.

9. The order of toxicity of arsenic and/or lead which might appear in edibile tissues in foods by virtue of metabolic processes should be determined.

H. M. NEWELL

Division of Markets, State of Illinois, Urbana, Ill.

I AM in charge of the Division of Markets in the State of Illinois and not officially connected with pure food regulatory work, but in that Division we are very vitally interested in this spray residue problem.

Illinois has no law which the officials think can be used as a basis for establishment of a spray residue tolerance. Our Attorney-General's Department has given us an informal opinion to that effect. There are some individuals who feel that under our present law we could establish and enforce tolerances.

All that we are doing at present is attacking the problem from a different angle. We are making progress toward producing and shipping cleaner fruit. The Federal Food and Drug Administration has seized during the past few years a large number of shipments of apples from Illinois, and our growers, of course, are very much exercised about that. They came to the Division of Markets for help and we started our work primarily to assist them in solving their problem.

Our plan is this: We have 4 field laboratories in our producing regions. Growers may bring samples of their fruit in for analysis and get the information in regard to what the load is on their samples. If they wish an official certificate on the sample, we will send an inspector to their packing-house, collect that sample, and an official certificate will be issued. To date, most of the growers have brought in their own samples.

Our growers are taking a very active interest in this problem and are making strenuous efforts in most cases to meet the tolerance. I think a great part of this interest has come about through education on the part of the Division of Markets' officials and State Horticultural Society officials. For the past two or three years, we have been urging the growers to put themselves in position to comply with the tolerances regardless of whether or not we had intrastate tolerances. We have pointed out to them that when their fruit is clean enough to be shipped in interstate commerce without danger of seizure they are in an advantageous position from a market viewpoint, whereas if they cannot move it outside of the state, they are bound to meet a lower market due to the fact that many small growers in the state cannot clean their fruit, and, therefore, it is not safe to ship outside of the state.

We are trying to get the situation so straightened out that we can have some state regulation. The matter may require a special act of our legislature to establish tolerances. In general, I feel, however, that we are making very definite progress toward cleaner fruit.

HUNTINGTON WILLIAMS, M.D., DR.P.H.

Commissioner of Health, Baltimore, Md.

I WISH that all the city and state health officers that belong to the Health Officers Section could have been here today. I think the absence of most of them shows plainly that they are not especially interested in this problem in the way that many of us wish they were. Perhaps it is because of different legal set-ups in different states and cities as to the control of

the food problems of this kind, but health officers certainly will not be able to ignore very long the pressing problems that must come before them in connection with poisoning hazards of the kind that lead and arsenic seem to point for the future, and I imagine they will have to change and make adaptations to the needs of the day.

In our city and state we have a very fine connection with the state health authorities, which goes back to the organization of the State Board of Health in 1874, which, after all, is a rather modern development from the City Health Department which goes back to 1797. I am especially glad to see Dr. Sullivan, State Food and Drug Commissioner of Maryland, here, because his department and the City Health Department have been in the very closest affiliation, and the two departments have been in close touch with Mr. Frisbie, who often visits us. The City Health Commissioner of Baltimore is an *ex-officio* member of the State Board of Health.

In the City Health Department, Ferdinand Korff is Director of Food Control. He has prepared this brief paper or rather, summary, of the Baltimore City efforts since 1931:

With the inauguration of the Baltimore Conference in 1932 where federal, state and city food control officials in the vicinity of Baltimore discussed their particular problems at periodic meetings, and the reviewing of current literature in a Journal Club organized within the Department of Health of Baltimore, specific attention was directed to the presence of hazards of spray residues on fruit and vegetables entering Baltimore.

At about the same time a large shipment of cabbages had been received in Baltimore, on which the inspection personnel of the City Health Department observed a greyish powder. The shipment was traced to a local railroad terminus and came from South Carolina. Samples showed the unbelievable amount of 20 grains of arsenic per pound of cabbage. Federal and state food control officials in Baltimore were informed of these findings and the Baltimore Station of the U. S. Food and Drug Administration advised through their coöperating agencies that an investigation be made of the growing areas in South Carolina. A number of the commercial food groups in the city were notified by telephone of the presence of arsenic on the cabbage, and all hampers were returned immediately to the original cars at the railroad station. Seizure was made immediately by the City Health Department and by the Federal Marshal.

Beginning 1932, each of the regulatory food agencies located in Baltimore—federal, state and city—assigned to themselves certain ports of entry of food in Baltimore. Railroad terminals were visited by inspectors of the U. S. Food and Drug Administration; truck shipments and wholesale commission warehouses were visited by City Health Department inspectors between midnight and early morning hours. State inspectors watched over growing areas within the state proper.

Since 1932 all analyses of fruits and vegetables made in the laboratory of the Baltimore City Health Department are reported to the Baltimore Station of the Federal Food and Drug Administration. Weekly surveys are made of the commission merchant district and retail markets where samples of fruits and vegetables are purchased for laboratory examination. Approximately 175 samples are obtained per year by the City Health Department alone, and an equal or greater number by both federal and state officials within the city of Baltimore. In 1935 there were found only 2 shipments which contained amounts of arsenic above the tolerance set by the U. S. Department of Agriculture—a portion of a carload of beans, and a shipment of quinces which was seized by the Federal Marshal. In 1935, determinations were made of lead as well as arsenic and traces of lead and arsenic below the tolerance set by the U. S. Department of Agriculture are present on the majority of fruits and vegetables coming into Baltimore, warranting continued surveillance of interstate as well as intrastate shipments of such foods.

Health officers cannot ignore these problems. They are hitched up with this whole problem of food poisoning outbreaks which crop up overnight, and very often leave the health officer without a suitable answer or explanation.

Wherever it is possible, an answer

is given to the problem, and in our city we have what we refer to as a "Food Poisoning Team." It is made up for the purpose of studying food poisoning outbreaks. It is composed of the Director of the Bureau of Food Control, the Director of the Bureau of Communicable Diseases, the Epidemiologist, the Director of the Bureau of Milk Control, and the Director of the Vital Statistics Bureau. Whenever there is a telephone or a news report of food poisoning, each official assumes responsibility of clearing his particular product or bureau of responsibility by field inspections and epidemiological investigations. The question of these spray residues is not so very different from other types of food poisoning due to chemicals which now and then confront a health officer.

Some time ago we had many people suffering with "ptomaine poisoning" which was traced to silver polish containing cyanide used in many big hotels. The product has been taken off the market.

Fluoride in roach powder is another problem. Dr. Felsen of New York has described fluoride poisoning from roach powder that had gotten mixed up with foods. This matter of food poisoning is very closely allied to the problem of spray residues.

ROE E. REMINGTON, PH.D.

Charleston, S. C.

I WANT to ask Mr. Frisbie if any progress has been made in this certification plan among the vegetable growers whose crops cannot be cleaned as compared with those that can be cleaned, and where the certification plan would be practical as applied to crops of that nature.

WALTER S. FRISBIE

Washington, D. C.

WE have not any plan to certificate vegetable crops. There is a different situation here. For example, we had trouble with celery a few years ago because of excess arsenic. We found there was no necessity for the use of arsenates as there are other insecticides that are effective and which contain neither arsenic nor lead. Therefore, we do not recognize a tolerance for either arsenic or lead in celery. The same is true with certain other vegetables.

Practical Application of an Industrial Health Appraisal Form*

LEVERETT D. BRISTOL, M.D., Dr.P.H., F.A.P.H.A.
Health Director, American Telephone and Telegraph Company, New York, N. Y.

AT the Annual Meeting of the American Public Health Association in Washington, D. C., October, 1932, the writer presented a paper before the Industrial Hygiene Section on, "An Appraisal Form for Industrial Health Service," in which he outlined briefly a preliminary and tentative form which later was published in the *American Journal of Public Health*.[1] This form was further elaborated by the writer [2] at a meeting of the American Management Association in 1933, while in 1934 an appraisal form was suggested to cover the special details of industrial accident and occupational disease prevention work.[3] The original appraisal form for industrial health service was referred in its preliminary and tentative state of development to the Committee on Administrative Practice of the American Public Health Association by the Section on Industrial Hygiene.

COMMITTEE ON INDUSTRIAL HEALTH APPRAISAL

In November, 1932, the Committee on Administrative Practice created a Sub-Committee on Industrial Health Appraisal and 11 members representing various public health and industrial organizations were appointed to study and follow the experimental use of the preliminary form. On the basis of group experience and judgment it was hoped that such a form might be revised, standardized, and officially adopted. In the original meetings of this sub-committee it was agreed that the members should promote the use of the preliminary and tentative form in the industries which they represented and, further, should encourage its use by other organizations so far as possible. Moreover, it was the opinion of the sub-committee that the preliminary and tentative form first should be applied in at least 10 or 12 industries of different sizes and types; and that after this practical application, with comments and criticisms from individuals who had used the form, the committee should go over the entire matter and, if it seemed desirable and feasible, should revise and standardize the form in such a manner as to represent actual industrial experience and group judgment.

TRIAL APPRAISALS

Due largely to the fact that all industrial personnel services, particularly those involving health activities, have been at a very low ebb during the last 2 or 3 years, only 7 trial appraisals have been available to date. The consensus of opinion of the sub-committee is that more trial appraisals should be obtained before proceeding to stand-

* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

TABLE I

BRIEF SUMMARY OF SECTIONS, SUBDIVISIONS AND ASSIGNED VALUES OF PROPOSED HEALTH APPRAISAL FORM FOR LARGER INDUSTRIES AND SUMMARIZED RESULTS OF TRIAL SCORING BY THREE COMPANIES

Sections and Subdivisions	*Original Assigned Values*	*Company Scores*		
		Company A	*Company B*	*Company C*
A. Vital Statistics Activities	75	72.6	17	47
1. Death Records	2	2	2	1
2. Tabulation of Death Statistics	2	2	0	0
3. Sickness and Accident Records	7	6.8	6	6
4. Tabulation of Sickness and Accident Statistics	9	9	9	9
5. Interpretation and Use of Statistics	55	53	0	31
B. Communicable Disease Control	150	114.3	119	110
6. Records and Case Investigation	15	12	9	9
7. Immunization	50	32.3	35	26
8. Special Preventive Measures	70	55	60	60
9. Public Relations	15	15	15	15
C. Tuberculosis Control	100	77.85	60	95
10. Case Finding	17	17	17	17
11. Medical Service	25	17.65	21	25
12. Field Visiting	23	18.2	17	23
13. Institutional Care	35	25	5	30
D. Occupational Disease and Accident Control	200	200	180	180
14. Records, Case Investigations, and Reports	30	30	30	30
15. Medical Examinations	50	50	50	30
16. Employees Brought to Professional Attention	30	30	30	30
17. Laws and Regulations	20	20	20	20
18. Inspection	40	40	40	40
19. Education	30	30	10	30
E. Personal and Environmental Hygiene of Office, Shop (Store), Factory, and Outdoor Field Workers	400	266.6	260.2	271
20. Daily Observation	10	10	10	2
21. Periodic Inspection	10	0	10	0
22. Field Visits	25	25	25	9
23. Medical Examinations	100	26.8	52.7	40
24. Employees Brought to Professional Attention	50	42.8	50.0	50
25. Sanitation of Headquarters, Branch Office Buildings, Shops (Stores), Factories and Outdoor Working Environment	100	88	85.5	100
26. Food and Milk Control	25	25	25	25
27. Health and Safety Education	60	37.5	47	40
28. Recreation and Rest Periods	20	11.5	5	5
F. General Health Publicity	75	71	65.3	55
29. Articles in Company Magazines	35	35	35	25
30. Health Bulletins and Reports	15	15	15	15
31. Health Posters and Movies	20	16	15.3	10
32. Special Health Publicity Activities	5	5	0	5
	1,000	802.55	751.5	758

ardize or adopt any form. Inability to obtain more trial health appraisals from various industries undoubtedly is due to the fact that the times are not particularly conducive to the stimulation of such health studies, surveys, and appraisals among industrial organizations. When business conditions further improve, it is hoped that the industrial health appraisal idea and plan may take more definite shape. In the meantime, in an attempt further to stimulate thought and action on this subject, the writer wishes to call attention to the practical experimental trial of the health appraisal form in three associated companies of the Bell Telephone System.

ORGANIZATIONS COVERED IN STUDY

In view of the experimental and somewhat confidential nature of these preliminary trial appraisals, the three companies will be referred to in this paper as "Company A," "Company B," and "Company C," rather than by their usual business names. Company A covers one of the smaller states and, as of December 31, 1934, had a working force of 4,453 persons of whom 2,502 were women and 1,951 were men. The territory of Company B covers one of the larger states. This organization, on the same date, had a total of 16,789 employees, of whom 7,155 were men and 9,634 were women. Company C has a territory covering several states. The last employee census of Company C showed a total of 21,356; of this number 13,381 were women and 7,975 were men. Responsibility for stimulating health and safety activities throughout each company as well as administering the benefit and medical program for employees rests with a vice-president or other official in charge of personnel and public relations, with the assistance of his department associates, lay or medical. To these companies and individuals, appreciation and gratitude are expressed for the time and effort involved in obtaining these trial appraisals and making them available for this presentation. Thanks also are due for various comments and suggestions which have been given with reference to possible minor additions or changes in the appraisal form. These will be helpful to the committee in the further consideration of the subject.

SUMMARY OF COMPANY HEALTH APPRAISALS

The limited time and scope of this paper will not permit of a complete, detailed statement of the methods and results of each survey and appraisal as applied to the three companies. For this reason only a brief summary of the health appraisals of these companies will be attempted.

Table I gives a condensed summary of the sections, subdivisions, and assigned values of the original proposed *Health Appraisal Form for Larger Industries,* as well as the summarized results of the trial scoring made by the three companies mentioned above. In each case the time covered by the survey and appraisal was for the last complete year of record previous to the making of the study. For Companies B and C it is the first and only appraisal made to date. In the case of Company A, the appraisal figures given in Table I represent the latest, or second, survey and appraisal of the company health program. Their first appraisal, made a year or so previous, showed a total score of 745. In other words, since its first appraisal this company has shown progress in the further development of its health program, and undoubtedly the other two companies would show much the same progress on their second appraisal.

INTERPRETIVE COMMENTS

It would be premature and unwar-

ranted to attempt at this time any specific comparison of the appraisal results of these three companies so far as their total performance or effort is concerned. As a matter of fact, the chief initial objective of such appraisals is not so much to compare one company with another as it is to point out to each company the value of self-analysis in order that it may see wherein it may further improve its health service as compared with a somewhat ideal program. In passing, it may be suggested, however, that it is wholly creditable for any industrial organization on its initial health survey and appraisal to be able to say that its health service is covering three-quarters or more of all those things which might reasonably be expected to be done under the most ideal program. Moreover, it is interesting to note that three somewhat widely separated companies are, on the whole, carrying on health programs of approximately equal value, although showing some small variations in the details of their activities.

Vital Statistics Activities—So far as the gathering of vital statistics and the keeping of records are concerned, each one of the three companies apparently is doing all that might be expected, although in two of the companies more might be done in the interpretation and use of their statistical records of employees. Accurate and systematic record-keeping of employee deaths, sickness, and accidents, as well as of industrial health services and activities, are fundamental for any satisfactory and objective appraisal. Many industrial organizations actually would be unable to make a survey or appraisal of value because of the lack of suitable reports and records; such companies may find it necessary and desirable to concentrate at the outset on the development of an adequate recording and reporting system.

Communicable Disease Control—In the control of communicable diseases the appraisals of these three companies indicate that more attention possibly might be given to requirements for the specific immunization of employees against smallpox, typhoid, and diphtheria. While the control of such diseases rests largely with the community health authorities, industrial organizations may do much to assist the public agencies in this respect by including attention to this subject in their own industrial health programs.

Tuberculosis Control—It is apparent from these trial surveys and appraisals that the control of tuberculosis among industrial employees is receiving considerable attention. That there is room in many organizations for additional effort in reference to prompt and adequate medical, nursing, and institutional care of cases is evident. Early physical examinations and diagnosis and the more complete and extensive examination of employee contacts are among the necessary requirements in the further development of the tuberculosis program in industry. In industry, as with the public in general, the questions should repeatedly be asked with reference to the case of tuberculosis: From whom did he get it? To whom has he given it? Dealing with the immediate case itself is paying attention to only one-third of the problem! Tuberculosis still is a leading cause of sickness among industrial workers, particularly of the younger age groups.

Occupational Disease and Accident Control—It is evident that these three companies were thoroughly alive to the importance of this subject. While there is no special occupational disease hazard associated with the work of the companies studied, and hence no requirement for an active program for the control of such diseases, all three companies have been engaged in well organized accident prevention cam-

paigns. In fact, safety work in industry has become in general one of the outstanding features and accomplishments of the entire personnel and operating services.

In the standardization and adoption of an official industrial health appraisal form it will be necessary to give further attention to this section on occupational disease and accident control, especially from the standpoint of those industries having recognized disease hazards. The questions might well be asked: Should an industry that has no special occupational disease hazard be scored under this section other than for its accident prevention work? Should an industry which has serious occupational disease hazards be given special credit if all control measures are carried out according to the appraisal form?

As indicated previously, the writer recently revised the section on Occupational Disease and Accident Control, in a paper [3] entitled, "Measuring the Industrial Safety Program." The appraisals of the three companies under consideration, however, were made on the basis of the original set-up of this section.

Personal and Environmental Hygiene—While the three companies show fairly equivalent *total* scores with reference to their programs having to do with personal and environmental hygiene of workers, they do differ considerably in the details of their efforts and performance as regards specific services and activities. It is evident that these companies, as undoubtedly is the case so far as most industrial organizations are concerned, have developed fairly adequate programs for the promotion of environmental hygiene, including all those factors having to do with general and special sanitation, safety equipment, lighting, heating, ventilation, and food and milk control in lunch-rooms and cafeterias. Just as the newer public health has stressed individual personal hygiene, so also must a newer industrial health place greater emphasis on the physical and mental condition of the individual worker. This means that more attention in the future must be focused on: (a) various types of medical examinations, preëmployment and periodic; (b) seeing that the employee gets the right type of medical, nursing, nutritional, or institutional care that he or she may require; (c) better follow-up and supervision of sickness and accident cases; (d) adequate health and safety education of the individual workers; and (e) personal *health* supervision somewhat analogous to the very efficient *safety* supervision that has become a part of all enlightened industrial policies and practices. This involves the extensive training of supervisory employees on all matters pertaining to health.

General Health Publicity—The three companies in question have carried on fairly complete general publicity in the interest of health, particularly as regards articles on health subjects in company magazines and the use of health bulletins and reports. There apparently is need for additional effort in the field of visual education and publicity through the valuable media of posters and moving pictures.

OPINION AS TO VALUE OF FORM

In closing, the opinion of one company representative may be quoted as to the value and practicability of an *Industrial Health Appraisal Form:*

> From observation and study of the form, I believe that it can accomplish, or provide a very definite aid toward the accomplishment of the objectives sought, namely.
>
> 1. To obtain a picture of the extent or degree of organization and development of modern industrial health practice in a company or any unit of the same.
>
> 2. To serve as an instrument to promote, guide, interpret, and measure health work in an industry or any of its units.

3. To arouse interest on the part of all company officials in the need for adequate health service in the industry; and to present those more directly in charge of the management of any unit with a tangible and concrete form of objective.

4. To provide stimulus for the development of a well balanced industrial health program, and to supply standard indices by which progress in health work may be followed by company personnel.

The extent to which such a form may be expected to gain these ends will no doubt depend upon a number of factors: the size, nature, and personnel policy of the business; the type of its employees; their home and outside interests; environment; etc. In addition, from the administrative point of view, the use of the appraisal form may accomplish something further, scarcely less important in any well rounded industrial health program. By classifying and evaluating each health policy or activity, it correlates many previously dissociated ideas in connection with our health programs and objectives. Each separate item may therefore be viewed in terms of its relationship to the entire health betterment job rather than as a detached and perhaps doubtful experiment.

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Jungle Yellow Fever

ONE ready rule in the early days was to ascertain first of all whether the stegomyia mosquito was present in a given area where men were suffering from yellow fever. If that mosquito was not present, yellow fever was ruled out. It now appears that this rule is not universally applicable. It has come to be recognized that yellow fever may exist, not only in a mild and almost unrecognizable form, but also in forms not associated with its recognized carrier, the stegomyia mosquito. The disease is transmitted and perpetuated in certain endemic areas by vectors different from the single one (stegomyia mosquito) encountered in Havana, Panama, and epidemic cities in general. Within these endemic areas, large parts of which are covered by jungle, there occurs yellow fever not carried by that mosquito and therefore offering to the scientific investigator new and as yet unsolved problems.

Among other things this means that in these areas the control of yellow fever through the customary attach on the stegomyia mosquito is inapplicable. It does not, however, mean that former methods of control were erroneous, because in coastal areas and in large cities which were formerly threatened by yellow fever the disease is carried by the stegomyia, and measures against this mosquito continue to be both cogent and necessary.

Since the strict correlation between the yellow fever mosquito—*aedes aegypti,* or stegomyia—and yellow fever can no longer be maintained, we now have some inkling of the reason why complete elimination of yellow fever from the large cities through destruction of mosquitoes was not necessarily followed by the disappearance of the disease from tributary rural areas. These rural areas themselves constitute a new and different problem. As the result of antistegomyia measures the disease has disappeared so far as urban outbreaks are concerned, and the next step will be to concentrate on the comparatively unknown jungle yellow fever.—The Rockefeller Foundation *Annual Report*, 1934, page 27.

Typhoid Carriers*

A Study of Their Disease Producing Potentialities Over a Series of Years as Indicated by a Study of Cases

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THE decline of typhoid fever, brought about by the growth of public water supplies and improved milk and shellfish sanitation, has left a "residual typhoid," caused apparently by typhoid carriers. In a community such as Massachusetts it is a fair statement to say that water- and milk-borne typhoid have become so rare, and have been so for the past few years, as to constitute an insignificant fraction of the total typhoid in the state. Little of the decline during this period and probably in the years to come, can be attributed to further improvements along these lines, so that the typhoid carrier becomes of increasing importance in the problem of reducing the "residual typhoid." The purpose of this paper is to study some of the factors that have underlain the decline in carrier-borne typhoid.

Table I presents the typhoid mortality rates for Massachusetts since 1875. The same data plotted on a logarithmic scale are presented in Figure I. The striking decline during the latter part of the last century and early years of this century was due almost wholly to the improvement in public water supplies, the curve of decline of typhoid almost matching that for the decrease of population not served by these supplies. Since about 1910 there has been no such improvement in the water supplies as would explain the even sharper decline in typhoid death rate. Unquestionably much of the improvement during the years 1910–1925 was due to milk sanitation, notably the advent of pasteurization, but here also the decline has been too striking to be explained solely on such a basis. It is obvious, therefore, that the principal decline in typhoid of recent years has been due, not to improved water supplies or better milk sanitation, but to factors affecting the principal reservoirs of the present-day typhoid infection, *viz.*, the carriers.

It has long been recognized by epidemiologists that the control of typhoid fever through the elimination of water-borne outbreaks has meant inevitably a decline in the incidence of the disease that would make itself manifest over a long period of years. Thus any substantial decline in typhoid fever during any period of time results in the production of fewer typhoid carriers

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

TABLE I

TYPHOID FEVER—MASSACHUSETTS

Death Rate per 100,000 Population, 1875–1934

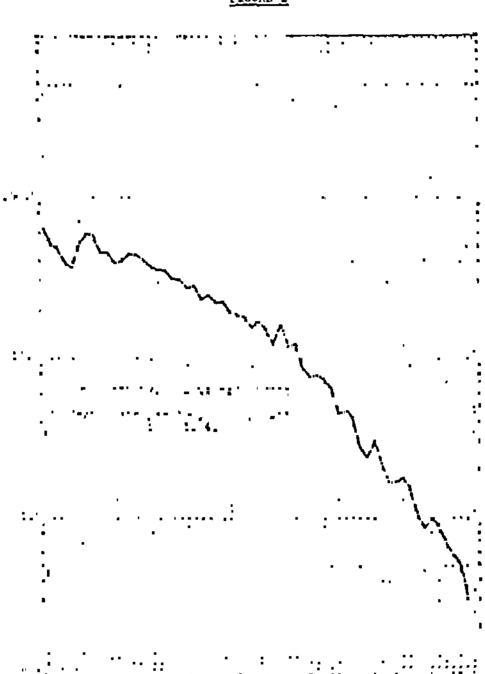
Year	*Rate*	*Year*	*Rate*
1875	64.1	1905	17.3
1876	52.5	1906	15.4
1877	47.8	1907	12.3
1878	39.3	1908	16.0
1879	36.3	1909	11.8
1880	49.5	1910	12.2
1881	59.1	1911	8.8
1882	58.4	1912	7.7
1883	45.8	1913	7.8
1884	45.8	1914	7.4
1885	39.4	1915	6.6
1886	40.0	1916	4.6
1887	44.8	1917	4.7
1888	44.6	1918	4.2
1889	41.0	1919	2.8
1890	37.4	1920	2.4
1891	35.9	1921	3.0
1892	35.4	1922	2.2
1893	31.4	1923	1.7
1894	30.6	1924	1.7
1895	27.2	1925	1.8
1896	28.3	1926	1.5
1897	23.2	1927	1.0
1898	24.7	1928	0.85
1899	22.3	1929	0.99
1900	22.5	1930	0.89
1901	19.7	1931	0.70
1902	18.6	1932	0.58
1903	18.0	1933	0.50
1904	15.6	1934	0.30

than in the previous epoch. As years elapse and these carriers die from other diseases, we find an accelerated sterilization of the population with respect to typhoid carriers. Thus in a community such as Massachusetts in which there has been a steady decline in typhoid fever for over 70 years, many more carriers die in a single year than are produced in that same year. Each year leaves the community, regardless of any active public health measures for carrier detection, with fewer sources of infection than were present during the preceding year. It might, therefore, be inferred that the decline in typhoid from year to year was an exact function of this decrease in number of living carriers. That such an inference gives far from a true picture of the situation will be evident from consideration of the ensuing graphs and tables.

For the purpose of this paper, all typhoid morbidity in Massachusetts has been calculated as a constant function of the death rate. Thus it has been assumed that throughout the period under study typhoid fever has consistently had a 10 per cent case fatality rate, so that the number of cases in any year has been 10 times the number of deaths. That such an assumption is justified is shown by the unchanged case fatality rates in the larger hospitals, coupled with the commonly accepted fact that, aside from the dietary regimen, there has been no outstanding advance in typhoid therapy for several generations. The use of death figures has eliminated any error due to variations in adequacy of case reporting, the death returns in Massachusetts having been reasonably complete throughout the period in question. Using this method for calculating morbidity, it can then be assumed that the number of survivors from typhoid fever in any year was 9 times the number of reported deaths.

It has further been assumed that 2

FIGURE I



per cent of those that recovered from typhoid continued as carriers the duration of their lives. Such a figure has been reported by one of us[1] as that found over a period of years in Massachusetts, and has been confirmed for New York by Ramsey.[2] That the rate of carrier production should be higher has been claimed by Havens[3] and by Garbat.[4] It is immaterial to the present problem, however, whether the rate is 2 or 10 per cent or any intervening figure, as any error introduced would apply equally throughout the calculations and thus automatically be eliminated. Consequently the number of carriers produced in any single year has been calculated as 2 per cent of the survivors in that year. It is thus possible to estimate theoretically the number of carriers that have been produced in any period of time. Table II shows the calculated number of carriers produced in Massachusetts since 1875.

To determine the number of carriers in a given population at a given time is impossible for many reasons. An approximation to this figure may, however, be made by determining the average age of typhoid fever patients over a period of years and, knowing the average expectation of life at any age and the carrier production rate, calculate roughly the number of carriers now living. Thus if it be assumed that the average age of typhoid patients has been constantly about 20 years (there has been no significant change in the age distribution of typhoid deaths for over 60 years), and that the expectation of life at age 20 has been 40 years, it would be assumed that the number of carriers in the population today was represented by those who had become carriers during the past 40 years. This is at best a very rough calculation, as it makes no allowance for the age distribution of the cases with varying expectations of life

TABLE II

PROBABLE NUMBER OF TYPHOID CARRIERS PRODUCED IN MASSACHUSETTS, 1875–1934

Year	*Deaths*	*Survivors*	*Carriers Produced*	*Year*	*Deaths*	*Survivors*	*Carriers Produced*
1875	1,059	9,531	191	1905	520	4,680	94
1876	881	7,929	158	1906	477	4,293	86
1877	814	7,326	146	1907	389	3,501	70
1878	679	6,111	122	1908	517	4,653	93
1879	637	5,733	115	1909	390	3,510	70
1880	882	7,938	159	1910	411	3,699	74
1881	1,072	9,648	193	1911	302	2,718	54
1882	1,079	9,711	194	1912	269	2,421	48
1883	860	7,740	155	1913	280	2,520	50
1884	875	7,875	157	1914	268	2,412	48
1885	768	6,912	138	1915	246	2,214	44
1886	800	7,200	144	1916	172	1,548	31
1887	922	8,298	166	1917	178	1,602	32
1888	943	8,487	170	1918	160	1,440	29
1889	891	8,019	160	1919	107	963	19
1890	835	7,515	150	1920	95	855	17
1891	821	7,389	148	1921	119	1,071	21
1892	827	7,443	149	1922	86	774	15
1893	750	6,750	135	1923	70	630	13
1894	748	6,732	135	1924	68	612	12
1895	680	6,120	122	1925	73	657	13
1896	723	6,507	130	1926	61	549	11
1897	607	5,463	109	1927	44	396	8
1898	663	5,967	119	1928	36	324	6
1899	612	5,508	110	1929	42	378	7
1900	632	5,688	114	1930	38	342	7
1901	561	5,049	101	1931	30	270	5
1902	538	4,842	97	1932	25	225	4
1903	527	4,743	95	1933	22	198	4
1904	463	4,167	83	1934	13	117	2

TABLE III

RATIO OF ESTIMATED TYPHOID MORBIDITY TO CARRIERS PRODUCED DURING PRECEDING YEARS IN MASSACHUSETTS, 1875–1934

		Cases per Carrier					
Year	Cases	40 Yrs.	30 Yrs.	20 Yrs.	15 Yrs.	10 Yrs.	5 Yrs.
1875	10,590	...	....	....	3.2	4.9	9.1
1876	8,810	...	....	....	2.7	4.2	7.9
1877	8,140	...	....	....	2.5	3.9	8.5
1878	6,790	...	....	....	2.2	3.3	8.2
1879	6,370	...	....	1.58	2.1	3.3	8.7
1880	8,820	...	....	2.19	3.1	4.8	12.6
1881	10,720	...	....	2.66	3.8	5.8	14.6
1882	10,790	...	....	2.67	3.8	6.2	13.8
1883	8,600	...	....	2.19	3.0	5.3	10.5
1884	8,750	...	....	2.27	3.1	5.5	10.2
1885	7,680	...	....	2.08	2.8	5.0	9.2
1886	8,000	...	....	2.20	3.0	5.2	10.2
1887	9,220	...	....	2.54	3.7	6.0	12.1
1888	9,430	...	....	2.60	3.9	5.9	12.2
1889	8,910	...	1.57	2.50	3.8	5.4	11.5
1890	8,350	...	1.47	2.39	3.6	5.1	10.6
1891	8,210	...	1.46	2.40	3.6	5.2	10.4
1892	8,270	...	1.48	2.53	3.6	5.4	10.6
1893	7,500	...	1.37	2.38	3.2	4.9	10.1
1894	7,480	...	1.40	2.42	3.2	5.0	10.4
1895	6,800	...	1.32	2.26	2.9	4.6	9.9
1896	7,230	...	1.42	2.42	3.2	4.9	10.8
1897	6,070	...	1.21	2.06	2.8	4.3	9.6
1898	6,630	...	1.33	2.24	3.1	4.9	10.8
1899	6,120	...	1.25	2.08	2.9	4.7	10.4
1900	6,320	.91	1.33	2.18	3.1	5.0	10.9
1901	5,610	.82	1.20	2.00	2.8	4.6	10.2
1902	5,380	.80	1.21	1.98	2.8	4.6	9.9
1903	5,270	.80	1.23	1.99	2.8	4.7	10.2
1904	4,630	.72	1.11	1.80	2.6	4.3	9.4
1905	5,200	.84	1.28	2.06	3.0	4.9	11.1
1906	4,770	.78	1.20	1.93	2.8	4.7	10.5
1907	3,890	.65	.99	1.64	2.4	4.0	9.1
1908	5,170	.87	1.33	2.24	3.3	5.5	12.1
1909	3,900	.67	1.01	1.76	2.6	4.3	9.4
1910	4,110	.73	1.09	1.93	2.8	4.8	10.5
1911	3,020	.55	.83	1.48	2.2	3.7	8.4
1912	2,690	.51	.77	1.39	2.1	3.5	7.9
1913	2,800	.56	.83	1.51	2.3	3.9	9.4
1914	2,680	.55	.82	1.52	2.3	3.9	9.8
1915	2,460	.52	.78	1.46	2.2	3.9	10.1
1916	1,720	.38	.56	1.08	1.7	3.0	7.8
1917	1,780	.40	.61	1.18	1.8	3.3	8.7
1918	1,600	.37	.57	1.12	1.8	3.3	8.7
1919	1,070	.25	.41	.80	1.3	2.5	6.9
1920	950	.23	.38	.77	1.2	2.6	7.4
1921	1,190	.30	.50	1.03	1.7	3.5	10.1
1922	860	.23	.38	.80	1.3	2.8	8.5
1923	700	.19	.33	.71	1.2	2.6	8.2

(Cont. p. 400)

can it mean that as years pass environmental factors that formerly were responsible for much typhoid fever have so improved. There has been no such change in Massachusetts as would account for the sharply downward trend in typhoid fever during recent years. That the carriers should have become so progressively more careful in their personal habits seems also entirely unbelievable.

A more likely explanation is to be found in the enviroment of the carrier. So much attention has been paid to the individual carrier that far too little attention has been given to the accessory factors that lead to a new infection. Anderson and Mack [5] showed that for a case of typhoid to develop from a carrier, a series of separate events must take place in regular succession, and that if the chain of events were broken in any link the new infection would not develop. One of these variable factors is the ingestion of the typhoid organisms by a susceptible host, and to this might be added the condition that these germs be in sufficient number to produce the disease.

Keeping in mind the importance of the environment of the carrier, we may examine Tables IV and V. These show by years the time that had elapsed since infection before the carrier was recognized, what might be called the "carrier age" of the carrier. There

TABLE IV

"CARRIER AGE" OF TYPHOID FEVER CARRIERS IN MASSACHUSETTS AT TIME OF DISCOVERY OF CARRIER CONDITION

Year in Which Discovered	*Number of Years a Carrier Before Detection* *							
	0–4	*5–9*	*10–14*	*15–19*	*20–29*	*30–39*	*40+*	*Total*
1909	..	..	..	1	..	..	..	1
1910	1	..	..	..	..	..	..	1
1911	..	..	..	..	..	..	..	0
1912	..	..	..	..	..	..	..	0
1913	..	..	..	..	..	..	..	0
1914	..	..	..	..	..	..	..	0
1915	2	..	..	..	..	..	1	3
1916	1	..	..	..	1	..	..	2
1917	2	..	..	..	..	..	..	2
1918	3	1	..	..	2	..	..	6
1919	5	2	1	2	1	..	..	11
1920	..	2	..	..	..	..	..	2
1921	..	..	..	..	..	..	..	0
1922	..	1	..	..	..	..	..	1
1923	3	..	..	..	..	..	..	3
1924	1	..	..	1	..	..	..	2
1925	1	1	1	..	1	..	..	4
1926	..	1	..	..	..	..	..	1
1927	..	..	1	1	2	2	1	7
1928	3	1	1	1	..	..	..	6
1929	1	..	..	1	..	..	..	2
1930	..	..	1	..	3	..	..	4
1931	1	1	1	..	1	..	..	4
1932	1	..	1	2	3	2	1	10
1933	2	1	4	1	2	2	..	12
1934	1	..	2	3	1	1	..	8
Total	28	11	13	13	17	7	3	92

* Does not include those found by release cultures during convalescence.

TABLE V

COMPARISON OF "CARRIER AGE" FOR MASSACHUSETTS, NEW YORK, MICHIGAN AND MINNESOTA CARRIERS AT TIME OF RECOGNITION OF CARRIER CONDITION

Number of Years a Carrier Before Detection

	Massachusetts		*New York* *		*Michigan* †		*Minnesota* ‡	
	Carriers	*Per Cent*	*Carriers*	*Per Cent*	*Carriers*	*Per Cent*	*Carriers*	*Per Cent*
0–4	28	30.4	58	25.6	8	11.8	53	26.2
5–9	11	12.0	40	17.6	7	10.3	27	13.4
10–14	13	14.1	18	7.9	7	10.3	21	10.4
15–19	13	14.1	22	9.7	8	11.8	21	10.4
20–29	17	18.5	47	20.8	23	33.8	34	16.8
30–39	7	7.6	25	11.0	10	14.7	29	14.4
40+	3	3.3	17	7.4	5	7.3	17	8.4
	92	100.0	227	100.0	68	100.0	202	100.0

* Senftner and Coughlin: *Am. J. Hyg.*, XVII:711, 1933.
† Personal communication from Dr. F. C. Forsbeck.
‡ Personal communication from Dr. O. McDaniel.

have been excluded from the tables those carriers who were recognized during their convalescence, and were thus afforded no opportunity to produce infections, and those who were unaware of a previous typhoid infection. The tables include only those carriers who were discovered through investigation of cases of typhoid, and were thus found to have been sources of infection. The tables thus represent the number of years that had elapsed between a known typhoid infection and the production of further cases. It is at once apparent from the tables that many more carriers have been detected within 10 years of their own infection than during any other decade of their carrier life. The surprising uniformity of data for other states (Table V) adds support to the data in Table IV, the slight difference in Michigan being hardly significant.

Such a finding is quite at variance with the current concept which too often pictures a carrier as one who had typhoid 20 to 40 years ago. So frequently is this concept encountered that some have even suggested that a carrier might enter a latent phase a few years after infection, subsequently as gall-bladder inflammation developed, entering an active phase, and thus causing infections. The figures of Tables IV and V hardly support such a hypothesis. The figures are even more striking when thought of in terms of the potential number of carriers available for discovery. It is obvious from Figure I showing the decline of typhoid in Massachusetts that there have always been throughout the period studied fewer persons in the community who had typhoid during the past 10 years than in the next preceding decade (10–19 years prior). It is thus all the more striking to find that the majority of the carriers have been found in that group that had actually the fewest number of carriers. We have thus a paradoxical situation of finding more carriers where fewer exist, and finding the fewest where the most exist.

The explanation for this paradox may be sought in the environment of the carrier. Table VI shows the relationship to the carrier of the individual whose infection prompted the investigation that led to the recognition of the carriers.

The family contacts represent those

TABLE VI

RELATIONSHIP OF CARRIER TO PERSON WHOSE INFECTION CAUSED DISCOVERY OF CARRIER—MASSACHUSETTS CARRIERS

Carrier Age by Years	*Total Carriers*	*Family Contacts*	*Casual Contacts*	*Maid Contacts*	*Milk or Food Contacts*
0–4	28	17	3	2	6
5–9	11	3	3	1*	4
10–14	13	3(1)	7	0	3
15–19	13	3(1)	5	0	5
20–29	17	1(2)	13	1*	2
30–39	7	2(3)	4	0	1
40+	3	0	1	0	2
Totals	92	29	36	4	23

* Had been in families less than 5 years.
(1) Two of these were men.
(2) Wealthy family with maid.
(3) Wealthy families with maids.

normally members of the carrier's household, while the casual contacts include relatives, visitors, and friends who had not been in constant contact with the carrier throughout the period since the carrier's infection. The "maid contacts" represent those infected by a maid found to be a carrier, though in each case the maid had been in the environment less than 5 years. The milk and food contacts include those instances in which the carrier was found to be handling milk or food for sale, thus representing an extremely casual and infrequent contact between the carrier and victim. It is significant that in the few instances in which a carrier had infected a family contact after 10 years of carrier life, the carrier was a man who would have less contact with food, or a member of a wealthy family where presumably the food was usually handled by servants. It is readily apparent that those carriers who were found within a few years after their own infection had infected members of their immediate households, and that as years elapsed those infected were progressively less intimately connected.

That as the years elapsed members of the immediate family were not infected has not meant, however, that all of them have had recognizable typhoid infection. On the contrary, the majority have had no such illness. That they have acquired a resistance to the disease can be inferred from the fact that they escaped apparent infection at the time of infection of a visitor or new arrival in the household. This can only mean, therefore, that there has been over a period of years a gradual immunization of these family contacts. It is thus to be concluded that a carrier if undiscovered will in a period of years either infect or immunize the normal immediate environment, and that subsequent infections are conditioned by the introduction of susceptible new material into the carrier's environment or sphere of influence. This is then the apparent explanation for the shift in the ratio between the number of cases in any year and the number of carriers produced in the preceding periods of years. It offers a reasonable explanation for the rather surprising fact pointed out above that the number of cases in any year was not a constant function of the number of carriers in the community but rather of the number of carriers produced during the preceding 5 to 10 years.

COMMENT

If the conclusions here drawn as to the importance of the first few years of the carrier-life of a typhoid carrier be correct, they constitute a very powerful argument for more adequate and rigorous supervision of all cases of typhoid fever as potential carriers. It affords no support to the attitude so often encountered that carrier detection and supervision is ineffective because it reaches so small a fraction of the total number of carriers in the community. The data here presented suggest, however, that all carriers are not of equal importance, those that have recently become carriers being of greater public health importance, not because of factors inherent in the carrier but because of the relative susceptibility of the environment surrounding the carrier. The carrier who has been such for many years has either so infected or immunized the immediate environment that new cases will not develop until fresh susceptible material is introduced. Such a situation develops with the arrival of a visitor or is presented when a carrier in middle or late life suddenly loses the normal means of livelihood and seeks a food handling position. In such a manner the carrier who has raised a family without apparent infection suddenly produces cases in the new susceptible environment. Whether or not this new environment be infected with clinically recognizable disease or develops a latent immunity may well depend on the magnitude of the infecting dose conveyed at various times by the carrier.

CONCLUSIONS

1. The incidence of residual (carrier-borne) typhoid fever in a given community is not a constant function of the total number of carriers in the community.

2. The incidence of residual (carrier-borne) typhoid fever in a given community is a function of the number of carriers produced during the preceding 5 to 10 years. This explains the rapid decline in the incidence of the residual typhoid after water-borne and milk-borne infections have been eliminated or reduced to a minimum.

3. Most carriers infect or immunize their immediate environment within a few years (5 to 10), subsequent cases developing principally among the new susceptible material introduced into this environment.

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City Park, New Orleans, City of 65th Annual Meeting of the A.P.H.A.

Escherichia Coli as an Indicator of Fecal Pollution in Oysters and Oyster Waters*

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IN this paper data are presented which should indicate the relative value of *Escherichia coli* and the colon group as indicators of significant fecal pollution. While the discussion is concerned only with fresh shell oysters, the question of a more specific indicator of significant fecal pollution than the colon group is of even more importance in the examination of market oysters. Obviously the same problem exists whether the object is to determine fecal pollution in shell oysters or market oysters. Market oysters are, after all, the same oysters except for handling and storage. Those members of the colon group which confuse the examination as to pollution in shell oysters confuse it even more perhaps in market oysters because these are often subject to non-fecal contamination from dirty equipment and are subsequently held. The result is that colon group types (not *Escherichia coli*) are found in excessive numbers, though they probably have no more significance as indicators of significant fecal pollution than a total colony count of bacteria.

The question of whether *Escherichia coli* or the colon group should be used as a basis for estimating pollution in oysters and other mollusks is a broad one of the utmost importance, for the colon group has been found confusing and unreliable, and some means of determining probable fecal pollution is essential as a check on the certification system, as a test for market oysters and for oysters taken from waters in which they grow or in which they are temporarily placed.

During the 10 years 1925 to 1935, thousands of samples of oysters and oyster waters (oysters 4,152, oyster waters 12,689) have been collected from the 20 different oyster areas into which the Chesapeake Bay, Md., has been divided. These data have already been studied extensively and have been the basis for several special reports by various members of the staff of the Maryland State Department of Health.[1, 2, 3] The one inescapable fact in these studies has been the lack of any significance which may be attached to individual oyster scores as indicators of pollution. So useless have oyster scores been found for this purpose that an agreement between those concerned was arrived at about 18 months ago to discontinue the oyster scores on the basis of the colon group in the sanitary oyster survey in Maryland and to test

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the value of *Escherichia coli* as an indicator of fecal pollution. During the past 2 years 1,463 samples of oysters and oyster waters have been examined for both their *Escherichia coli* and colon group scores.

The term *Escherichia coli* is construed as indicating any member of the colon group which is unable to grow in Koser's citrate medium. Such organisms are invariably methyl red positive, Voges-Proskauer negative, produce indol, cannot ferment cellobiose, and produce gas in suitable media at 46° C.

Examinations for *Escherichia coli* were made using both the modified Eijkman medium of Perry and Hajna [4] and standard lactose broth, as presumptive tests. Determinations for the colon group were made in accordance with the standard procedures of the American Public Health Association. A report of this work up to January 1, 1935, has been given in the *Journal* for June, 1935. The Eijkman test in its present form has been found so superior to lactose broth as a presumptive test for the isolation of *Escherichia coli* from oysters and oyster waters, that it is being recommended for trial in other laboratories in consideration of its inclusion as part of a new standard procedure for the examination of shellfish.

Through a grant from the American Public Health Association, it has been possible to compile and study the more than 1,000 *Escherichia coli* results, and more than 4,500 colon group results from certain oyster areas in Maryland. An attempt has been made to present these data in a way that should show directly what correlation, if any, there is between quantitative *Escherichia coli* and colon group concentrations in oysters and oyster waters and pollution as judged from sanitary survey data. The data have been studied in two ways. In one approach, the average number of *Escherichia coli* and colon group organisms for a number of sampling stations were "spotted" on sanitary survey maps for the Choptank, Chester, Severn, and Patuxent Rivers in Maryland. In this way, the relationship both of *Escherichia coli* and the colon group to known pollution could be studied.*

No extensive comments on the significance of these data are necessary. The important point is the close agreement evident between the concentration of *Escherichia coli* in oysters and observed pollution. In order to make this relationship clearer in some respects, the data for the 4 rivers were also prepared in linear fashion; that is, the rivers were straightened out and the data summarized for mile sections and studied in relation to the principal sources of pollution. It is unfortunate that a larger number of *Escherichia coli* results as well as those for more sampling stations were not available. It is believed, however, that in spite of the comparatively small number of *Escherichia coli* results (1,463—see footnote Table I) available at the time, they do attest the superior value of this organism as an indicator of significant fecal pollution.

An attempt to clarify further the relationship between pollution in oysters and oyster waters as judged from sanitary survey information and as expressed by *Escherichia coli* and the colon group has been by giving average concentrations of *Escherichia coli* and the colon group organisms for pollution classified as "not significant," "slight," "moderate," and "heavy." (See Table I.) While it is impossible to classify accurately pollution at sampling stations on the basis of sanitary survey data alone as "not significant," "slight," "moderate," or "heavy," it is possible to do this in a roughly accurate manner.

* It has been found impossible to reduce the size of these maps to that suitable for inclusion in this article.

Such a method has afforded the only approach to an evaluation of the bacteriological data. If the classification could have been more accurately made on other than bacteriological grounds, the data would be more convincing. Pollution varies for any sampling station with tides, weather, and temperature. The biology of the oyster further complicates the relationship and makes and accurate evaluation difficult.

in the oysters are still very high, but *Escherichia coli* is practically absent.

Temperature affects greatly the number of colon group organisms present in both oysters and water. During the summer months when the temperature of the water rises above 50° F., there is a large increase in the colon group in both water and oysters. In oysters this increase may be enormous. When the temperature of the water is below 50° F., the concentration of colon group approaches that of the *Escherichia coli*, but during the summer, the non-fecal types of the colon group apparently find a most suitable environment for multiplication, probably due to organic matter present. The environment in the oyster is doubtless even more suitable, and results in high colon group scores on oysters taken during the period of active feeding. It is possible that *Escherichia coli* may also increase somewhat both in water and oysters when the temperatures of the water are unusually high, but water temperatures are always relatively low for the growth of this organism, and this, together with its inability to utilize carbon from organic matter (as indicated by its inability to use carbon from citrate and other organic salts) places it in an unfavorable environment for multiplica-

TABLE 1

RELATIONSHIP OF ESCHERICHIA COLI AND THE COLON GROUP TO FECAL POLLUTION IN OYSTERS AND OYSTER WATERS

VARIOUS TRIBUTARIES OF CHESAPEAKE BAY

Fecal Pollution as Judged by Sanitary Survey	*Pollution as Indicated Bacteriologically (Most Probable Numbers per 100 c.c.—McCrady)*			
	Oysters		*Oyster Waters*	
	Esch. coli	*Colon Group*	*Esch. coli*	*Colon Group*
Not significant	4.5 (422)	1,158 (694)	1.5 (238)	61 (1,026)
Slight	49.0 (230)	1,979 (476)	5.5 (287)	100 (1,752)
Moderate	196.0 (97)	1,634 (184)	36.0 (92)	134 (686)
Heavy	167.0 (30)	1,509 (97)	67.0 (67)	376 (413)

Figures in parentheses represent number of examinations.
Escherichia coli determinations: Oysters 779, Water 684, Total, 1,463.
Colon Group determinations: Oysters 1,451, Water 3,877, Total, 5,328

In general, the classification of a sampling station as not significantly, slightly, moderately, or heavily polluted, was based on the proximity to towns, sewers, privies, and on the population of towns, type of sewage disposal, and the volume of water. In the Chester River for example, the major source of pollution is from Chestertown, a town of more than 2,800 population with untreated sewage. A secondary source of pollution is Centerville (population 1,291) on the Corsica River, a tributary of the Chester River. Very little, if any, pollution from Centerville reaches the Chester River. The only oysters showing any significant pollution on the basis of *Escherichia coli* are those from the upper part of the river nearest Chestertown. In the lower part of the river, many miles from any pollution, concentrations of colon group organisms

tion. The data presented show that *Escherichia coli* tends to disappear gradually as self purification occurs, while the non-fecal colon group types increase. This is in agreement with the observations recently reported on the Whangpoo River in China.[5]

It will be noted in Table I that the average *Escherichia coli* (most probable number per 100 c.c.) results for 422 samples of oysters from waters judged to be without any significant pollution, is 4.5, the average for 230 samples from slightly polluted waters was 49, while the average of those from moderately polluted water (97 samples) was 196 and heavily polluted (30 samples) 167. In contrast to this, there is little if any difference in the average results based on the colon group. In oysters from heavily polluted waters the average was 1,509 against 1,634 for moderately polluted waters, 1,979 for only slightly polluted waters, and 1,158 for waters free of any noteworthy pollution. There is, therefore, a close agreement between pollution as observed and as expressed quantitatively by *Escherichia coli* for oysters. On the basis of the colon group, no such correlation exists.

For oyster waters there is rather a nice transition from 1.5 *Escherichia coli* per 100 c.c. in unpolluted water, to 5.5 for only slightly polluted, to 36 for moderately polluted, and to 67 for heavily polluted water. These numbers seem in much closer agreement than the colon group results which are 61, 100, 134, and 376 respectively. It might be inferred from these figures that the *Escherichia coli* results indicate a lowering of the margin of safety. That this is not true is attested by the fact that more individual *Escherichia coli* have been recovered from fresh raw sewage where the Eijkman presumptive test has been used than total colon group types where lactose broth was used as a presumptive test.[6] *Escherichia coli*, as has been repeatedly demonstrated, constitutes over 95 per cent of the colon group types found in fresh human feces. The increase in the colon group both in water and oysters may be considered, therefore, to indicate that self purification is going on. The colon group tends to distort and magnify the picture of real pollution in water while in oysters it may indicate gross pollution where there is none.

A more specific idea of the magnitude of the differences between the numbers of *Escherichia coli* and of colon group organisms in oysters may be obtained from Table II. The results from individual samples indicate the enormous differences between the number of *Escherichia coli* and of colon group organisms which frequently occur, and the greater efficiency of the presumptive Eijkman test over lactose broth for the isolation of *Escherichia coli*. The data are representative of those obtained during the warmer months when the temperature of the Chesapeake Bay water is above 50° F. (April to November) and especially when the temperature is above 70° F. (June to September). The degree of pollution as judged from sanitary survey information is also given. The data indicate a relative correlation between the most probable numbers of *Escherichia coli* and a lack of such correlation on the basis of the colon group.

Colony counts of bacteria growing at 37° C. on standard nutrient agar were also studied. These counts have been found to parallel the concentration of colon group bacteria and to indicate pollution in a general and similar manner.

SUMMARY AND CONCLUSIONS

Data are presented for the concentration of *Escherichia coli* and the colon group in oysters and oyster waters for

TABLE II

COMPARATIVE EFFICIENCY OF EIJKMAN TEST AND LACTOSE BROTH FOR ISOLATION OF ESCHERICHIA COLI FROM OYSTERS AND THE RELATIONSHIP OF ESCHERICHIA COLI AND COLON GROUP ORGANISMS TO POLLUTION

No.	*Eijkman Test Esch. coli*	*Lactose Broth Esch. coli*	*Lactose Broth Colon Group*	*Estimated Pollution-Sanitary Survey*
135	1,800+	1,800+	1,800+	moderate
136	1,800+	200	1,800+	moderate
137	1,600	500	1,800+	moderate
138	1,600	110	1,800+	moderate
140	20	0	1,800+	slight
141	80	50	170	slight
429	20	0	9,000	negative
431	20	20	20	negative
435	20	20	350	slight to negative
504	170	50	130	moderate
506	900	900	1,400	moderate
509	900	0	1,800+	moderate
510	80	20	500	moderate
524	50	0	80	slight
525	20	20	80	slight
529	0	0	500	negative
531	0	0	9,000	slight
532	0	0	350	negative
534	0	0	9,000	negative
539	0	0	9,000	negative
545	130	20	140	slight
550	20	20	50	negative
581	0	20	50	negative
610	50	70	90	negative
611	40	0	40	negative
Average	312	117	907	

the Choptank, Chester, Severn, and Patuxent Rivers, in Maryland, together with sanitary survey information. No significant correlation between the concentration of colon group bacteria in oysters and various degrees of pollution has been found in any of the areas studied. In the case of oyster waters, there is a fair correlation between the concentration of colon group bacteria and pollution. During the summer months there is a large increase of colon group bacteria in both water and oysters. Enormous increases in the colon group content of oysters are found when the water is warm, in both grossly polluted and relatively unpolluted areas. If, therefore, the quality of oysters was determined, especially when the temperature of the growing waters was relatively high, and on the basis of the colon group, those from waters of unquestionable purity would in many instances be judged as grossly polluted. The colon group cannot, therefore, be relied upon to indicate significant fecal pollution in oysters.

A close correlation has, however, been found between the concentration of *Escherichia coli* in both oysters and water and the amount of pollution. The results indicate that *Escherichia*

coli is superior to the colon group as an indicator of significant fecal pollution in both oysters and oyster waters.

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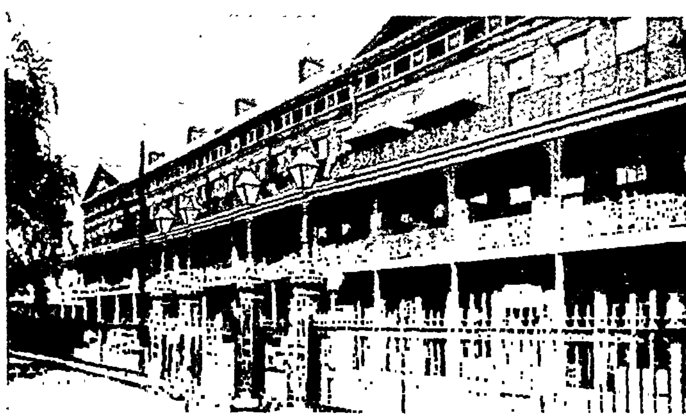

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Laboratory Control of Water Purification Plants*

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WE who are engaged in the control of public water supplies do not know everything about the quality of water, but enough is known to build and operate purification plants so that public water supplies are seldom unsafe. The phrase, "enough is known," must be taken precisely at its real content. The reference is to the state of knowledge; not to the application of that knowledge, because it is fairly evident that, in recent years, whenever a public water supply has not met all of the requirements of safety to the consumers, the failure was not due to the lack of knowledge. It was occasionally due to the lack or inavailability of equipment, but more often due to the simple failure of a responsible personnel to use its knowledge and the equipment intelligently.

We may properly digress for a time into a discussion of problems of water works personnel—problems associated with its frequent lack of training and often with the lack of real interest. One of the interesting developments of recent years has been that, in many plants over the country, the men engaged in water supply operations are taking voluntary training when the requirements of the state in which they work do not make it necessary. The fact that only 3 states at the beginning of this year required that their purification plant operators be regularly trained and licensed is in itself evidence of the fact that the people, since the first glow of interest in sanitary progress at the beginning of the century, have settled back into a state of complacency and lack interest in the training and qualifications of public service personnel, especially those associated with the vital task of public water supply.

Again, lack of interest on the part of water works operators that frequently interferes with the proper operation of purification plants, is purely a by-product of the political control under which so many water works plants operators work. Men in charge of properties, or divisions of water works departments, are in operating positions not because of any fitness for the work, but because they happen to be, shall we say, precinct committeemen of the victorious political party.

These impediments to the application of the knowledge that we have of the adequate control of water purification plants, affect the content of this discussion, but are somewhat tangential. The title is "Laboratory Control of Water Purification Plants." Fortunately for our purposes, Webster defines the laboratory as "the workroom of a chemist." That introduces pre-

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cisely the idea that is essential to the consideration of this topic. The entire purification plant is the workroom of the chemist. A purification plant is a laboratory that cannot be separately directed. I was somewhat amazed a to receive a communication from the head of a water department of a city of over 100,000 population, saying that a campaign was being waged by a consulting laboratory in his community to obtain a contract to carry on the laboratory work of his purification plant. The rejoinder is obvious to me, that if the water department wished to contract for the operation of a purification plant with a consulting concern, the operation to include definite and complete control, with certain criteria as to costs, etc., in the contract, the proposal might be entertained, but to detach the laboratory control from the routine operation of a purification plant is inconceivable. The spirit of the water works laboratory must be the spirit of intelligently trained curiosity, and the moving spirit of a purification plant must be the application of that training and intelligent curiosity in an attitude of never being quite satisfied that things are right until they have been shown to be right.

That type of control starts with the moment that the raw water enters a plant. The first observation is that of the visible physical load, or turbidity, of the raw water. The referee contact with this observation may be carried on in the laboratory, but the practical hour to hour performance (and the performance must be from hour to hour and not from day to day) should be in the hands of shift employees. They can be trained to do the work, especially if they know that their work is being adequately and frequently checked by the laboratory staff.

The next step is the performance of simple field tests as to the adequacy of preliminary treatment. When Streeter's research indicated to all of us that practically two-thirds of the bacterial removal in the purification plant was effected before the water went to the filters, it should have made plain that the importance of control of preliminary operations needs to be emphasized. These field tests may be so simple as the trial filtration of the coagulated water to see that the finely divided material has been collected in the floc. The process may be extended to jar stirring tests, with varied doses of coagulant. They may even go so far as combination of these latter tests with tests for residual alumina. Wherever a test of this type is made, the control laboratory should do no more than referee the performance of those tests by the shift operators, or the laboratory should be staffed and in direct contact with the operators every hour of the day. Relatively few plants need to indulge in the latter type of organization. The great majority of plants are operated and the tests are adequately made by reasonably intelligent workmen. Performance of tests according to a definite outlined routine must be required at regular intervals on every shift.

The next very valuable piece of field mechanism is the simple turbidimeter (Tyndall ray type indicator) so well developed by Bayliss in his work at Baltimore. This has an amazing capacity to indicate deviations from normal performance on the part of filter units and to flash emphatically to the eye and mind of an operator that something has occurred to break down the satisfactory performance of the sand layer. Its use does not require college training. The men simply need to be taught to correlate the indications given with past performance of the plant. In a purification plant where normal performance results in a turbidity of about 1/10 p.p.m., a deviation only up to ½ p.p.m. will be very evident, and

while the average consumer will have no knowledge of the change, and while it is unlikely that such change will have any adverse physiological effect upon the consuming public, the deviation is indicative of the immediate necessity of reviewing the purification processes which have preceded this stage in the treatment.

By and large, the average plant performance will produce a safe drinking water if the indication given by the fine turbidimeter is good, and if the next observation, that of the amount of residual chlorine, is regularly made and adequately controlled. There is the strong fortress of plant control. A great deal of attention in the forthcoming edition of *Standard Methods* has been given to the determination of chlorine. The precision, or attempted precision, of statement of this test is designed to meet the needs of the laboratory, but in the day to day control of purification plants, if the laboratory reviews the hourly observations of residual chlorine at least once a day and correlates the plant observations with the laboratory records, the field tests do not need to be carried on with the precision that should be expected in the laboratory. At the same time, the field tests probably have a more direct bearing on the overall efficiency of plant operations than do the laboratory tests. When it is stated that the field tests do not need to be performed with the precision required of a laboratory test, one does not imply that basic considerations as to reasonable accuracy in handling reagents, reasonable cleanliness of apparatus, reasonable care in the handling of samples, should not be fulfilled. It is not implied that anyone can neglect the care of the orthotolidine solution, or expose reagents, standards and test samples to direct sunlight, nor by any means should one neglect to hold the sample treated with orthotolodine in the dark until the color development is complete. These important phases of the chlorine test can be just as well understood by the shift men as by the expert chemist.

It is necessary to confess a considerable degree of astonishment at the fact that, in spite of the directions in previous issues of *Standard Methods* against exposure to sunlight, many laboratories have been found to carry on all of their work and keep their permanent standards in the direct sunlight. Occasionally, one is led to think that possibly the simpler minded laborer of the plant could be used to read *Standard Methods* to the trained chemist, so as to be sure that the latter paid attention to all of the detail that he should.

We have travelled through a purification plant controlling the preliminary treatment of the water, observing the residual turbidity after filtration and checking the efficiency of chlorination. Perhaps some of you will be shocked when it is implied that many of the other tests which we all make are "window dressing." That term is used to irritate some of you. Every operating test beyond the above brief list should be examined in the light of this question—"Just what does it contribute to the successful operation of the plant?"

Obviously, if ammonia or carbon treatment is being used for taste improvement, and if prechlorination is practised, the laboratory staff will add to its daily routine the task of reviewing, by odor and associated tests, the efficiency of the dosage. Set dosages and foolish economy produce consumer bad will. Set dosages at focl-proof high rates waste money. The laboratory naturally must balance needs with dosage.

The field of historical record of plant performance is the establishment of bench marks by which the value of the field tests above enumerated can be de-

termined. We will probably all agree upon the bacteriological record as the principal one that meets this need.

Shall that record include an enumeration of the bacteria? Koch's rule No. 2 was "To allow a complete and constant control of the bacterial efficiency of filtration, the filtrate from each single filter must be examined daily." The simplest record form which this examination can take is that of the bacterial count. At the same time it is likely to be indicative of all the facts that one needs to know about the individual filter. Is its performance equal to that of the other units? Has there been some misadventure in the sand layer? The 37° count will reasonably answer those questions. Shall we apply the 37° count to finished water and to distribution samples? The answer is in the affirmative, but not for the reason that would probably be given by many. The enumeration of bacteria in distribution samples frequently evidences lack of circulation, if the count is high. Lack of circulation might result in unpleasant tastes and odor, causing consumer complaints. The bacterial increase is likely to occur before the taste and odor develop. As a means of determining the hygienic efficiency of filtration, it is doubtful that the bacterial count has great value. With other conditions unchanged, there is considerable evidence that with a bacteria count in finished water of 10 or 100 or 1,000, no consumer reaction will result. The tradition persists that high counts are associated with lack of safety. High counts of heterogeneous organisms probably indicate improper operating control. High counts of homogeneous groups of organisms may indicate a simple unloading, or too long storage, or too little draft from a main.

When we make an estimate of the presence and density of members of the coli-aerogenes group, we are building up the historical record that is most serviceable as a bench mark in plant operation. To what extent should coli-aerogenes records be accumulated? Under present-day conditions one can reasonably expect of a well controlled purification plant that an accurate record of coli-aerogenes density under all load conditions in the raw water, especially the peak loading, be made. One can also assume that with a somewhat lesser degree of accuracy, water in the various intermediate processes of purification should be checked. The filter effluent before final chlorination should, in the United States, be checked with the Treasury Standards, namely, the examination of five 10 ml. portions, to the end that, as a general operating result, the filtered water before final chlorination meets the requirements of the Treasury Standard. In other words, there should be a shade of disappointment on the part of the plant superintendent if the efficiency of the prior phases of the purification process has not been great enough to make chlorination unnecessary, except as a final extra factor of safety. The water as delivered by the plant should not only be examined, in the United States, in the five 10 ml. portions of the Treasury Standard, but also an equal number of 100 ml. portions should be examined. The reason is that if the plant operator sets as his yard-stick the simple terms of the Treasury Standard, he has no data aside from compliance or noncompliance with the standard. If, however, he sets as his yard-stick the absence of coli-aerogenes organisms from the great majority of the 100 ml. portions examined, he not alone has an added feeling of assurance, but when deviations occur that indicate the presence of the group in the 100 ml. portions, they should occur before such deviations would appear in the 10 ml. portions, thus an opportunity may be given to review and correct the

faults in the procedure that led to the deviation in the larger samples examined. The finished water plantings should also extend to an equal number of 1 ml. portions. Only in this way will an adequate appraisal of maximum density be had when and if some misadventure reduces the normal efficiency of operation.

An intelligent operator who feels the weight of his responsibility to the thousands of people dependent upon him for safe water will not omit any finding of fact that, even temporarily unpleasant, eventually adds to the records that make future operation safer. The useful working tool given laboratory workers by the option of confirmation of coli-aerogenes by planting in selective liquid media makes possible the production of a greater volume of mathematically defensible records. With the development of correlative data that indicate the close approximation of the confirmed technic adopted with the full complete test, the operator will find himself in a position to appraise more intelligently the significance of steps in plant operation in the terms of coli-aerogenes density.

American practice with relation to coli-aerogenes group definition puts a somewhat higher requirement upon water supply methods than is common to many other countries. We are all familiar with the discussion that has gone on for a number of years with relation to the use of certain selective media for primary planting of water samples. The broad implication of the use of lactose broth, as contrasted with selective broths, is that by using the former, not only are certain coli-aerogenes forms that are frequently called "attenuated" included in the findings, but also a class of organisms which probably are not essentially associated with human sewage pollution but with processes of destruction of vegetation. If the goal is set of removing all these from the finished water, instead of removing only the definite fecal strains of coli, the hygienic quality of the supply automatically becomes higher. Certain studies in this country have indicated that the sanitary survey correlates better with the coli-aerogenes findings from primary planting in a selective medium than with similar findings from primary planting in the more catholic lactose broth. In other words, it is evident that definitely bad sanitary backgrounds of samples are associated with positive findings in the selective media, and that the routine process in this country includes those doubtful cases of sanitary surveys where perhaps there is no specific evidence that could be correlated with the presence of the coli-aerogenes group.

But can we not agree that those border-line conditions should be improved? American water supply practice has met fairly well the financial and physical requirements necessary under the present method of measuring water quality, and while the correlation of the sanitary survey may be a bit more definite, if the other method is followed, it is also evident that the degree of protection to the consumer against adverse conditions would be lessened just in the degree that the laboratory control of water supplies narrowed itself to search for more specific organisms. Perhaps when political control of water departments is not so obvious, when the training of purification plant operators is more widely insisted upon, and when a shade more knowledge is at hand as to the precise meaning of some of the tests we make, it may be possible to narrow the category of organisms that we call coli-aerogenes; but that time is not yet here.

We have mentally travelled through the purification plant; observed the shift men making many necessary

routine tests vital to good performance; we have set up the technically trained staff as a referee group, principally engaged in training and maintaining the efficiency of the operator as a bench chemist. We have observed that the technical staff, in making additional tests, has made them because each one had been shown to contribute definitely to the excellence of performance of the plant. They have also made records in terms of bacterial efficiency, and have correlated these records with the simple field tests. What else is there for the technical staff to do? A great deal. They are engaged in research studies preparing to meet the problems of tomorrow.

A New Method for Estimating Population

THE March 9 issue of New York State *Health News* describes a new device for estimating population increase:

The population of New York State on July 1, 1935, was 13,226,417 and will increase by July 1, 1936, to 13,345,909, according to a recent estimate by the Division of Vital Statistics, State Department of Health. These figures are based upon the assumption that the relative growth of the population of the cities and counties of the state since the last federal census of 1930 was the same as that of the entire country. The estimates previously employed by the department were computed by the "arithmetical method," which assumes that the annual increase in population after a census is equal to the average annual increase during the last intercensal period. The new estimate for the state for 1935 is less by 468,000 than the estimate formerly used.

The new figures admittedly have the single virtue of being, on the whole, less inaccurate than those hitherto used. The division is now investigating the possibility of a permanent solution of this most important problem through the development of sources of local authentic information, by means of which the estimates could be currently modified in keeping with the movement of population.

Under normal conditions the arithmetical method produces reasonably satisfactory results. The years following 1930, however, were clearly not normal. The growth of the population has definitely slowed down because of the continued decrease in the birth rate and the almost complete cessation of foreign immigration. In the 10 year period 1921–1930 the net immigration averaged over 300,000 a year, while in the 5 year period 1931–1935 the number of aliens who departed from this country exceeded the number of aliens admitted by almost a ¼ million. One has to consider also the important additional fact that as a result of the depression the movement of population within the country has undergone a marked change. In 1930–1933, as a direct consequence of rapidly diminishing opportunities for employment, the hitherto prevalent movement from country into city was reversed. There is reason to believe that because of improvement in the economic situation, the trend after 1933 has again become cityward.

Under these conditions, arithmetical estimates had no longer the degree of dependability that was formerly attached to them. It was felt inadvisable, however, to make any change in the established procedure because there was hope that a federal census might be taken in 1935. This expectation has not materialized and it was therefore necessary to abandon the arithmetical estimates as being entirely too high and misleading. Various experiments led the Division of Vital Statistics to decide, until a better way could be found, to adopt with slight modifications the method developed by the Census Bureau, according to which "the computed increase in the population of the country as a whole [is] distributed among the states, cities, and counties in proportion to the share which each of these areas had in the increase between 1920 and 1930."

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

TROPICAL MEDICINE IN THE UNITED STATES [1]

IN view of the fact that a large part of this country is semitropical and in close touch with tropical countries, and that for many years we have been scourged with malaria over a large part of the South, and have had all too frequent epidemics of yellow fever, it would seem that the study of tropical diseases would have been taken up earlier than it has been. Indeed, physicians in America did not seem to awaken to the importance of investigating tropical diseases until the appearance of the textbook by Sir Patrick Manson in 1898. Some of this indifference may be ascribed to the lack of knowledge of fundamental facts necessary to intelligent methods of prevention, yet Manson's work on filaria was done in 1878, and Laveran discovered the malarial parasite in 1880.

The Spanish-American War, in 1898, not only brought us into closer touch with tropical countries and their diseases, but put several such countries under our control, and was the beginning of our existence as a world power. The World War further emphasized the necessity of understanding tropical diseases and the methods of guarding against them.

The first organized work on tropical medicine, as far as the United States is concerned, was in 1898. Credit must be given to Surgeon General Sternberg of the Army for the establishment of two Army Medical Research Boards. The one under Major Walter Reed solved the mystery of the transmission of yellow fever and showed that the disease was caused by a filtrable virus. Captain Richard P. Strong organized the Board in the Philippine Islands, which has for 35 years turned out a large amount of valuable information. Two years after the establishment of the Army Board, the government of the Philippines established a Bureau of Science to which Dr. Strong was transferred as head of the biological department.

In March, 1903, the American Society of Tropical Medicine was founded. After 10 years it had 121 active, 18 corresponding, and 37 honorary members; and in 1913, a journal, now known as the *American Journal of Tropical Medicine,*

was established. In 1921, the membership had fallen to 108, and attendance at the meetings averaged from 10 to 20. It now has 429 members, is active, and its meetings are well attended.

Tulane was the first university to establish a Department of Tropical Medicine in a medical school, in 1911. Two years later this was organized as a School of Tropical Medicine and Hygiene, becoming in 1919–1920 again a department. The next Department of Tropical Medicine was established at Harvard Medical School in 1914. In 1913, a Board for the Study of Tropical Diseases was organized in the Medical Department of our Army, with headquarters in Porto Rico, with Major Bailey K. Ashford as President. In 1926, the School of Tropical Medicine at San Juan was established through his influence. It issues the *Porto Rico Journal of Public Health and Tropical Medicine*. In 1928, there was founded at Columbia University the Department of Tropical Medicine as a sub-department of Medicine. In 1929, there was established at the University of California, the Pacific Institute of Tropical Medicine, with Dr. Alfred C. Reed as Director. This list seems to complete the roster of special departments of tropical medicine in the United States, but many medical schools are active in research and teaching, or both.

Vanderbilt University has a strong Department of Preventive Medicine and Public Health from which many contributions on tropical medicine have come. The Department of Parasitology at Johns Hopkins has made a number of studies. George Washington University has given courses in Tropical Medicine continuously since the session of 1907–1908. Our Army and Navy have furnished many excellent studies under men like Edward R. Stitt, Surgeon General, and Captain Charles S. Butler. The studies carried out by Colonel Siler and Major Hitchens, and others, of the Army, have been notable.

The International Health Division of the Rockefeller Foundation has done much to stimulate the study of tropical diseases. Its most notable discoveries have concerned yellow fever. Its workers have transmitted the disease to Rhesus monkeys and to mice, and have developed a practical method of immunization. Thus the remaining mysteries of this dreaded disease have been cleared up, and a wealth of scientific facts have been added to our knowledge.

In 1934, the American Academy of Tropical Medicine was founded. With an active society of tropical medicine and this American Academy, there will be no lack of scientific stimulus to the study of tropical diseases, from which our country will benefit. There is every reason to believe that the interest in tropical diseases by our universities and schools will continue to increase and that greater facilities for study and teaching will be provided.

Our Public Health Service has carried out fairly extensive experiments on the transmission of tropical diseases by mosquitoes transported in airplanes, and two of its officers [2] have developed an efficient fumigant for planes. Since yellow fever is under good control in the tropical countries with which we are in close touch, there is little fear that the disease will be introduced within our borders. Nevertheless, it is comforting to know that our Public Health Service maintains efficient units for the control of this disease and is active in protecting us against introduction through travel routes. In view of fast passenger steamships now on the ocean, the regular airplane service with the tropical countries to the south of us, and a world-wide airplane service being rapidly developed, there is every reason for us to maintain a watchful attitude and to cultivate to its fullest extent the study of tropical diseases.

Being a world power carries responsibilities as well as dangers. Though it seems that we were slow in realizing the importance of tropical diseases to our country, we have now made a good start and may well be proud of the discoveries which American institutions and American men have given to the world in respect to these diseases.

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LEST WE FORGET

WE have always been impressed with the similarity between religion and public health. People are apt to be good religiously when they are afraid of death. When there is danger of an epidemic people are good from the health standpoint. The United States once, for a short time, had a national board of health created when we were menaced by a yellow fever epidemic from the tropics at a time when we did not know anything about the spread of the disease. With the passing of this danger, the national board of health as such was allowed to die, though fortunately many of its functions were passed on to what is now our Public Health Service.

Many of us can recall the time when the danger of bovine tuberculosis to human beings was a really live question and gave rise to many controversies. American work in 1901 and 1902 proved the danger, against the opposition of Robert Koch, and some leading American physicians preferred to accept Koch's authority to the proved facts furnished by their own countrymen. Except among the veterinarians and the packers, bovine tuberculosis has not been much discussed for some years. The packers are solely interested in the losses they may sustain due to the disease. The veterinarians are interested in suppressing bovine tuberculosis from the professional as well as the economic standpoints, but the medical profession appears to be singularly indifferent. Health officers in general, both state and city, are still actively interested in the pasteurization of milk, which was brought about chiefly through the proved danger of bovine tuberculosis to children, especially, though there are many other diseases which may be transmitted by milk which are prevented by the process.

The English are more persistent than we are and when a study is begun they carry it through. Since the appointment of the British Royal Commission following the London Congress in 1901, there has been constant study of bovine tuberculosis in England under Governmental grants by well trained men, and their reports are always enlightening. While we were content in this country to say that bovine tuberculosis was apt to produce glandular and bone disease in children, the English persisted in their studies, and have brought to light some 120 cases of pulmonary tuberculosis due to the bovine strain, 40 of which have been observed since 1933, but which Koch said did not occur.

The most recent report[1] gives the histories of two families, in each of which there were multiple cases of pulmonary bovine tuberculosis. In one there were 2 cases of pulmonary disease in adults and 1 of glandular disease in a child. The mother had been a milker and was afterward reported as a case of pulmonary tuberculosis. Of 10 children in the family, 1 died in infancy, 1 had pleurisy with

effusion and infiltration of the right apex, which had cleared up, 2 were among the 3 cases mentioned in the article, and the remainder were healthy. The daughter died, and at autopsy the presence of the bovine strain as the causative organism was confirmed.

In the second case, a man, his wife, and a child were affected. The husband and wife both gave cultures which were below the standard virulence usually found in bovine organisms, the two cultures being identical in character. Gastric lavage done on the 3 children gave a positive result in 1, the organism recovered being again a dysgonic strain, highly virulent for the rabbit. While the history is somewhat involved, the reporters believe that the infection spread from the husband to the wife.

Five cases of familial tuberculosis due to the bovine organism have now been found in England.

We owe much to our Bureau of Animal Industry and the veterinarians working under it. They have kept alive this question of bovine tuberculosis and have given us a considerable number of tuberculosis-free areas and many partial or completely accredited areas. With the pasteurization of milk which is now so general, tuberculosis of bovine origin has decreased to a very gratifying extent, but if our vigilance is relaxed, there is every reason to believe that the disease will increase in cattle, and in corresponding measure be carried to human beings.

REFERENCE

1. Griffith, A. S., and Munro, W. T. Family Tuberculosis Due to Bovine Tubercle Bacilli. *Brit. M. J.*, July 27, 1935, pp. 147–150.

PREVENTION OF EXPERIMENTAL POLIOMYELITIS

REASONING by analogy from one species of host to another, or from one infection to another is not always safe or even profitable as a conjecture in communicable diseases. Occasionally, however, valuable leads are obtained in this way. Armstrong and Harrison [1] and Armstrong [2] have published recently continuation of work at the National Institute of Health of the U. S. Public Health Service in which they have used the infection of encephalitis (St. Louis type) in mice as a "feeler" for judging the value of intranasal prophylactic measures against poliomyelitis, the experimental work on poliomyelitis, of course, having been performed on monkeys. These authors' earlier work [3, 4] on the efficacy of sodium alum has been confirmed by Sabin, Olitsky, and Cox [5] who also used tannic acid solutions against poliomyelitis following the earlier work of Olitsky and Cox [6] on the use of tannic acid against nasal instillations of the virus of equine encephalomyelitis in mice. It appears from the more recent work of Armstrong and Harrison that picric acid is safer and somewhat more likely to be effective than alum or tannic acid.

It is to be hoped that uncontrolled application of such agents will not take place until their evaluation for human use can be carried out.

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5. Sabin, A. B., Olitsky, P. K., and Cox, H. R. *J. Bact.*, 31:35–36 (Jan.). 1936.
6. Olitsky, P. K., and Cox, H. R. *Science*, 80:566–567 (Dec. 14), 1934.

THE 1935–1936 YEAR BOOK

THE words "Desk Copy" have been placed appropriately on the cover of the 1935–1936 *Year Book,* which was distributed with the March *Journal.* Our members may profitably keep it on their desks and at their elbows for constant reference.

The editor was aware as the individual committee reports passed through his hands that they represented some uncommonly fine material. Only when he saw them assembled under one cover, however, did their full importance and significance strike him. This is, in his opinion, the most outstanding collection of committee reports ever presented to the readers of the *Journal.* They are worthy of careful and continuous study. The Sections will be hard pressed to match their excellence next year. They are the summaries and conclusions of many painstaking pieces of work, and the results of unnumbered hours of individual labor, correspondence, and conference. If the last word in group-thinking on pressing public health problems is wanted, the *Year Book* is the first place to look for it.

Further, this *Year Book* is more than a collection of committee reports, valuable as they are. Through the industry of the executive office, several useful lists have been compiled and included. The one which will be most frequently consulted, doubtless, is that of the health officers of the United States—state, city, and full-time county. So far as the last named is concerned, we stand aside for no one on the basis of accuracy, at least, as of the date recorded. Other things published in the *Year Book* for the first time are: a list of universities in the United States and Canada conferring public health degrees, together with brief statements of entrance requirements; a list of American foundations making grants of amounts in excess of $5,000 for medical and public health purposes in 1934; a list of cities surveyed by the American Public Health Association; lists of winning and honorable mention cities and counties in the Rural and City Health Conservation Contests.

The 1935–1936 *Year Book* is veritably a "compendium of useful information." If the membership will respond to the invitation in the foreword and suggest items that may be added next year and in the future, it may be desirable eventually to issue the *Year Book* with the upper left-hand corner punched as is the telephone book so that it may be hung within easy reach for as frequent consultation.

BACK NUMBERS WANTED

Readers of *The American Journal of Public Health* are asked to send unwanted copies of the following issues—

September, 1930
January, 1931
January, 1933

—to the American Public Health Association, 50 West 50th Street, New York, N. Y., as these issues are out of stock.

These will be much appreciated, and reimbursement of postage will be made in each case.

PUBLIC HEALTH EDUCATION*

"More Murderous than Microbes"—Such is poverty. It is brought out in illuminating newspaper reviews of "Why Keep Them Alive?" by Paul de Kruif, published by Harcourt, Brace, New York, N. Y. This is not a review. We have space here only for quoting several paragraphs.

Balanced diets. It's nice to talk about them for your children and mine. But what's the use of talking about a balanced diet to a coal miner with six children, when he hasn't had a chance to get into the mine for months?

It is notorious that our big newspapers will lavish space, will blacken their front pages with headlines about 60 lives lost in a tornado, or a hundred taken in a steamship fire, or a thousand lost in some remote Oriental earthquake; yet they remain almost mute, with a mysterious hush-hush, about the incredibly greater never-ending disseminated disaster, the perpetual emergency of mass maiming, sickening, suffering, dying that is caused by destitution.

Said one reviewer, Lewis Gannett, in *New York Herald-Tribune:*

All over the country, wherever De Kruif wandered, he discovered doctors, nurses, teachers heroically saving lives—and then saw the saved lives being wasted.

As "Shortening" Is to Pie Crust—More shortening makes pie crust richer. See what shortening did for a new play on Broadway, according to *New York Sun* (March 7, 1936):

Five times before "Co-respondent Unknown" opened, it was played before specially invited audiences—dress rehearsals in lieu of an out-of-town opening. The reaction of these audiences indicated that there were certain dead spots which should be eliminated, and accordingly, late in the night, after one of those performances, Kenneth MacKenna, director of the play, and Mildred Harris, co-author, sat over a manuscript with brutal blue pencils poised over the dialogue.

In some speeches perhaps just a word or two were cut. Sometimes the two found it possible to cut a whole speech entirely. Compression went further when occasional whole pages were obliterated, and in one instance a complete scene, taking nearly 4 minutes, was done away with entirely. . . .

To the producers and the playwright, the fact that the play was 10 minutes shorter after 15 minutes of dialogue had been cut was no great puzzle—it was expected. The lines left in the play were so much funnier—because the letting-down poor lines were out—that the laughter of the audience forced the actors to wait until the tumult died down before going on with their lines, at dozens of points throughout the play. In other words, 15 minutes of audience laughter had been added, in place of 10 minutes of superfluous dialogue.

The health educator doesn't need time out for laughs, but he does long for audiences which listen to the end—*and are ready for more another time.*

Cutting words, phrases, or paragraphs—cutting out the "dead spots" in our copy—may turn the trick.

Meaning Something or Other—What the significance to health educators may be we won't attempt to state. An article on "Health Food Fad" tells of

a growing business to help you eat yourself healthy—with a slam for more familiar foods and a profit for somebody.

The article in *Business Week,* 330 W. 42d St., New York, N. Y. (Feb. 29, 1936; *20 cents*), discusses

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

highly specialized products that promise health and vigor; some that offer relief from everything from anemia to zymosis.

Sample prices: 47 cents for a 3½ oz. can; 2 lb. for $3.69; 45 cents for 16 oz.; 14 oz. of a broth extract for $2.50.

What is wrong with other foods, as well as the unusual qualities of the "health foods" are basic selling talk.

"Live and Let Live"—This is the title of the sixth of a series of annual publications "distributed free in the interest of street and highway safety, and for the promotion of more pleasurable use of automobiles."

It is a 40 page scrapbook of pictures in color, sketches, strip cartoons, page cartoons, statistics, etc.

Copies should reach editorial writers, and all who might write or speak on safety topics, or plan safety measures.

Many pages could be reproduced individually as fliers, or enlarged as posters or as display panels. Several of the pages would do a good job if copied on large painted billboards.

Copies of "Live and Let Live" are supplied free, in letter-sheet size, and pocket-size, as well as a new highway safety test entitled, "What's Wrong." Address: Travelers Insurance Co., Hartford, Conn. They may be able to supply copies of some of the earlier issues of the series.

A New Mark for Health Education in Survey Reports—The recently issued report on public health in Pittsburgh sets a new record in completeness of the reporting on health education. The health education material is made easily accessible through a distinctive, common heading, and by mention in the chapter sub-headings of the table of contents.

One or more paragraphs on "Community Health Instruction" appear in the chapters on control of acute communicable diseases, tuberculosis control, maternity hygiene, infant hygiene, preschool hygiene, school hygiene, venereal disease control, mental hygiene, cancer control, heart disease control. We are confident that nothing like this has been done before. There are no such paragraphs under vital statistics, laboratory service, public health nursing, general sanitation, milk and food control.

To the above, amounting to nearly 3 full pages, is to be added a 5 page chapter on "Community Health Instruction." This sets another high mark in city health survey reports.

We were tempted to quote the whole of the health education material, but will reproduce the two concluding sections which include emphasis on 4 vital points: (1) a basis for planning; (2) a definite and unified program; (3) a trained director of public health education; (4) a representative committee to stimulate coördination of activity and joint program planning.

SUMMARY

The lack of a comprehensive public health education program in Pittsburgh is apparent. Many people are reached by pamphlets, lectures, and motion pictures, but there is a marked deficiency in both verbal and written instruction particularly in connection with venereal diseases, dental hygiene, mental hygiene, and sanitation. The health education activities are not in general planned on the basis of studies of special needs and opportunities in different districts of the city or among special age or racial groups.

The health instruction given in the schools, as discussed in Chapter IX, provides a valuable medium of spreading information regarding matters of community and personal hygiene.

Although some health material appears in the daily newspapers, this valuable channel of instruction could be more extensively and effectively utilized.

There is a considerable amount of community health instruction work being done in Pittsburgh, but it is not coördinated, and is not based on any definite and unified program. Undoubtedly with a closer coördination of activities, much more could be accomplished than at present.

FUTURE PROGRAM

1. In view of the importance of developing an individual and community consciousness in regard to health matters, and to acquaint the public of all classes with the present-day responsibilities and services of the health department, provision should be made in the city department of health for:

a. A trained director of public health instruction.

b. The printing and circulation of a monthly health bulletin and an annual report which would include not only statistical data but interpretation of the city's health services and problems.

2. As soon as the Tuberculosis League can be relieved by the Department of Health of all or a part of the responsibility it has had to assume in the tuberculosis control program, the Tuberculosis League should develop in coöperation with the Department of Health a more extensive health education program.

3. Consideration should be given by official and voluntary health and social agencies, and the Medical Society to the establishment of a health education committee made up of representatives of the organizations in the city now engaged in this work to stimulate coördination of activity and joint program planning.

In *The Appraisal of Public Health Activities in Pittsburgh, Pennsylvania: 1930 and 1933,* by Marian H. Ewalt and Ira V. Hiscock. Bureau of Social Research, Federation of Social Agencies, 519 Smithfield St., Pittsburgh, Pa. 125 pages. Not dated, but issued in 1935. *$1.00.*

Where to Get Motion Pictures—The most helpful publication available on this subject is "Guide to Motion Pictures," edited by Louise Franklin Bache (formerly with Syracuse, N. Y., Health Department), and published by Community Chests and Councils, Inc., 155 East 44th St., New York, N. Y. 46 pages. *50 cents.*

Of the 17 classified lists the following cover health topics; recreation and physical education; general health and sanitation; child health and child care; dental hygiene; nutrition; disease prevention; social hygiene; safety; first aid, disaster relief and nursing; nature study.

The "Guide" is a substantial pamphlet. The pictures listed are largely from authoritative sources. The brief synopses tell more than is to be found in most comprehensive lists, and seem to be as reliable as is possible without examination of the pictures. The typographical arrangement of other essential information makes for easy use. The lack of abc order of picture titles under each topic is a disadvantage.

There are some omissions, both of pictures and sources of information. Will any one who examines the "Guide" please tell the editor of pictures which should have been omitted, or should have been included?

Health Education in December Journal—Certain references in *American Journal of Public Health,* Dec., 1935, are here noted:

In "Public Health a Problem in Distribution" by Brown (page 1287) we have a review of public health situations which all will wish to be acquainted with, in addition to this specific paragraph:

> The inclusion of intelligent public support as an essential to satisfactory public health service needs no justification. Unfortunately, we have not been able to command it to any great degree. All too frequently our support has been based more upon emotion than upon reason because we have concentrated our attention on health service to the individual and neglected to educate him and demand public support for such services. The results have been manifest in the inertia of the public while essential health services, in many places, were either abolished or reduced to a poverty level. We cannot hope to maintain a high degree of health service until we find the way to secure and maintain intelligent public support for our programs.

"Annual Report of Montefiore Hospital" (page 1333) calls attention to

a report in which an institution is "humanized."

Be sure to read "Humanizing Knowledge," page 1358.

"Scientific Exhibits at Milwaukee" (page 1389) reports on 6 displays with citations of their particular merits.

Public Health Education Section is given 4 new members on page 1391.

Health Education in January Journal—Of interest to those concerned with health education are the following references in *American Journal of Public Health*, Jan., 1936:

See "Malaria in the Philippines," by Russell, pages 1–6, for a glimpse of unused scientific information, and for the mention of "time rather than money" as a main factor in some situations.

See "The Health Conservation Contest," by Rankin, pages 13–16; by McCamant, pages 17–19; by Lentz, pages 20–22.

Of course you will read "Precision in the Choice of Health Education Methods," by Shepard and Arfsten, pages 54–58.

Under "Books and Reports" see discussion of the present-day value of the "family medicine book," in review of "Modern Home Medical Adviser," pages 77–78.

New members of Public Health Education Section are listed on page 87.

Scientific Exhibits at New Orleans—Increasing success has marked, at the Annual Meeting, the showing of displays reporting research, illustrating methods or devices, or recording history.

Any one with an idea to propose or a display to offer is invited to write to the A.P.H.A. office in New York.

It would be timely to have displays at New Orleans from A.P.H.A. members in points around the Gulf of Mexico, and further south.

Important to observe: an exhibit is not a satisfactory form for presenting detailed statistical data which can be examined more satisfactorily if offered in mimeographed or printed form.

Reprint and Pass It On—Quite a few articles which appear in the *Journal* would be useful if circulated in non-professional groups. Some would favorably impress a chamber of commerce health committee. Newspaper editorial writers would welcome some reprints. Leaders in divers clubs and associations would be interested by reprints of certain articles. Others should go to the school superintendent, or to principals, or even to the teachers. But a full list of openings would take too much space.

Reprints are supplied at a nominal cost rate. Write promptly for reprints of your own article, or one by another writer.

When you have reprints to spare please send sample to editor of this department. Please tell how many cents a copy should be sent.

Telling about the Hospitals—"Educating the Public About Our Hospitals," by Dr. Allan Craig, is a report of the Committee on Public Education, American Hospital Association. Its 7 large pages include a variety of useful material.

An interesting angle is suggested which others than hospital people may well use (the italics are ours):

> Every doctor and every hospital today is stressing the importance of preventive medicine. Hospital publicity may well point out *the fact that it is old-fashioned to call the doctor only after disease has made its presence known* by pain and suffering. Our most precious possession, health, may best be safeguarded by the proverbial ounce of prevention—which is still worth pounds of cure.

How hospitals may use printed matter:

There is a mass of literature intended for public use which is published by various recognized organizations each year. One of the great difficulties is to get this material into the hands of those to whom it would be of benefit. Every one of our hospitals can, with little added trouble or expense, greatly assist in the solution of this difficult problem.

Why not establish a means for the distribution of this valuable and reliable material in your hospital? A corner may be set aside in the hospital lobby for the exhibition of posters and a reading table provided where pamphlets may be attractively displayed. Suitable literature may be placed in the patient's room for his attention during convalescence. Every hospital has dozens of opportunities for the effective first-hand distribution of good educational literature along the lines of community health.

In *Hospitals*, 18 E. Division St., Chicago, Ill. Mar., 1936. *35 cents.*

Health Education Exhibits at New Orleans—Space has been allotted for a proposed health education exhibit. This to be divided between public health education in any of its specialized forms, or its technics, and school or college health education.

Statements as to what you would like to see, and what you have to offer, will be welcomed in care of the editor of this department of the *Journal*.

A most cordial invitation to participate is extended to members all around the world who are concerned with health education.

The Value of Early Prenatal Care—Dr. Estella F. Warner, Office of Child Hygiene Investigations, U. S. Public Health Service, reports:

Evidence is constantly being sought which would indicate that the various efforts to disseminate public health information are influencing health practices and benefitting the people. One criterion which has been accepted as indicative of the effectiveness of the health education aspects of a maternal hygiene program is the advance made toward obtaining information or care during the early months of pregnancy. For several years the Office of Child Hygiene Investigations has issued a series of 9 prenatal letters upon the request of individuals. No publicity has been given this service and none sought. The material was intended merely to meet the requests received by this office. Nevertheless, approximately 4,000 series are distributed each year. More than 50 per cent of those receiving the letters have replied answering the question as to the month of pregnancy when the request for information was made. Careful check of these replies has been made for the last 3 years. It is interesting to note that in 1933, there were *no* requests for information made by women during their first month of pregnancy while in 1935, 6 per cent of all the requests were received from women in the first month. In 1933, less than 50 per cent (49%) of the requests received were from women who had not yet attained the fifth month of pregnancy, while in 1935, that number had mounted to 64 per cent. Therefore, even in a 3 year period there seems to be evidence that women are becoming more appreciative of the value of prenatal care early in pregnancy and making effort to obtain information.

Are there reports available from similar state or provincial services?

A Health Tabloid—The *New Haven Sunday Register*, Feb. 23, 1936, issued a health tabloid magazine section of 40 pages. The broad field of public and personal health is covered. Signed articles come from health leaders in and out of the state. High points in the health program are featured and deficiencies are emphasized.

The advertisements were subject to approval by officers of the County Medical Society. Not always has such coöperation been possible. Philadelphia, for example, gave up the tabloid idea because the newspaper insisted upon using unapproved advertisements. Should we question the statements which follow, or are such advertising claims so comparatively innocent that they may be accepted by a medical society or health agency.

Health and Purity in home made candy.

Electric Cookery is the most healthful

cooking method the world has ever known.

There is Health Insurance in . . . dairy products.

Insure your Health with . . . washable wall paper.

Quite thoughtfully, Publicity Assistant Paul H. Stevens has secured copies of the tabloid to be sent to the first 50 public health workers who address him at Department of Health, New Haven, Conn.

"What I Read in the Papers"—That's "all I know" said Will Rogers more than once.

And all many people know about medicine is what they learn in the same way. Hence the importance of a competent press relations bureau to the average medical society.

So Dr. Iago Galdston, in *Medical Economics,* has told the county medical societies how to get their say into the newspapers. We quote two paragraphs of generalizations from the close of the article:

Do not censor the news. Do not ask a paper to suppress a news item. Express yourself about it as strongly and as emphatically as you feel warranted, and leave the rest to the editor. If so-and-so claims a cure for cancer, that claim, right or wrong, is news. The editor is obliged to print it. But he will usually be more than willing to begin the news item with some such phrase as "In the face of strong skepticism expressed by the medical profession of Crossway County, Dr. So-and-So today claimed that he had discovered a cure for cancer."

You can trust a reporter (Stanley Walker warns you against the female of the species); but it is best to have your "say" in writing. If you are making a statement over the telephone have it read back to you. In case of an interview, be sure to see the copy before it goes to press; make that a condition of consenting to be interviewed. The world is full of honest mistakes.

"Have You Seen the Papers?" in *Medical Economics,* Rutherford, N. J. Feb., 1936.

It's "Social Disease" in Middletown—Again the Middletown, N. Y., Department of Health illustrates how an effective, inexpensive annual report can be prepared.

The especially clear mimeographing, the humorous illustrations, the conversational text, and the quality and weight of the paper used, make an effective combination.

On the page headed "Social Disease Control" Dr. Shelley says that "present signs are the public may soon cease to be an ostrich about social disease."

Is it possible that Dr. Shelley is needlessly hesitant? Has he slipped "venereal" or "syphilis" just once into a morbidity report to check local reactions?

Dental Hygiene in Canada—The Canadian Dental Hygiene Council is a national voluntary public health body, composed of both laymen and dentists, organized for promoting dental health. It is endorsed by the Canadian Dental Association, and all of the Provincial dental associations. It receives grants from the federal government at Ottawa, the Canadian Life Insurance Officers' Association, the Canadian Oral Prophylactic. Association, and philanthropic bodies.

The annual report for 1935 is entitled "A Poor Life This, If . . ." this being the title of a report from the field secretary. There is a report of a dental health campaign in Prince Edward Island, and another on recent developments in state health insurance in Canada.

The Dominion headquarters is in Medical Arts Building, 170 St. George St., Toronto.

Health Education in Palo Alto—Two of 5 paragraphs under "Education and Publicity" are quoted from the 1935 report of Palo Alto, Calif., Health Department:

The chief avenues employed for distributing health information have been the

schools, the health center and the press. Each home visit of the nurses is used as an opportunity for health propaganda and instruction. Talks by members of the department have been made to clubs and group meetings.

For purposes of the health conservation contest, account has been kept of health articles appearing in the local paper, a total of 1,521 columnar inches of health material appearing during the year. Of this total 827.5 inches represented health articles of local origin. Acknowledgment is made of the valuable assistance of the local newspapers in the publication of health department news and the keeping of contemplated health projects before the people.

Hygeia, February, 1936, Contents—Published at *25 cents* a copy, at 535 N. Dearborn St., Chicago, Ill.

Infantile paralysis . . . The privileges of parenthood (the preschool child) . . . General anesthesia (history) . . . Incidents in a medical fairy tale (Dionne chronological tables; day by day records of caloric intake, and foods used; weekly weight chart, etc.) . . . The physical Franklin (the most versatile American) . . . Cancer among princesses and queens . . . Heart disease of children . . . The three household thermometers . . . Saving eyesight in industry . . . Hernia . . . Seasickness . . . The dilemma of the disfigured matron (medical mystery tale) . . . William Harvey . . . The "Why" of vaccination . . . Curious stories about health . . . Glands (their influence) . . . Parting is such sweet sorrow (teeth) . . . P.A.D.: Prevent Asphyxial Death . . . New Books on health . . . Questions and answers.

In "School and Health":

What children need training in mental health . . . A first grade's journey to healthland . . . Detroit has new school health program . . . Pupil guide sheets in health education in senior high school . . . A teacher's self measurement scale . . . New health books for teachers and pupils.

To those who might write about school health education:

The editor of the School and Health Department of *Hygeia* will be pleased to receive articles dealing with the solution of concrete and practical health education problems in the school. Articles must not exceed 1,000 words in length. Stamps should accompany manuscripts to insure their return if rejected. All articles accepted will be paid for at regular rates. Address Editor of School and Health Department of *Hygeia*, 67 Clyde Street, Newtonville, Mass.

Hygeia, March, 1936—Published at 535 N. Dearborn St., Chicago, Ill., *Hygeia* for March, 1936, contains the following:

"The Story of Louis Pasteur" (helpful comment on the new motion picture) . . . Cancer is curable (what every one should know) . . . How diseases came with the white man to America . . . Some facts and fancies about babies . . . Steps in the detection and alleviation of deafness (illustrated) . . . The backward child (behind the wall of the retarded mind) . . . The blue man (against the careless use of silver preparations) . . . The tired child (symptoms of chronic fatigue) . . . Sex education (what shall I tell the child) . . . Meeting emergencies at home (ingenuity in devising "hospital conveniences") . . . The traveler's food and drink . . . Preventable deformities . . . P.A.D. (more prevention of asphyxial death) . . . Varicose veins (cause and cure) . . . The case of the coryphee's cousin (again the doctor's Scotland Yard) . . . Hideyo Noguchi (a master mind of medicine) . . . The skin in health and disease . . . These teeth of mine . . . A milkmaid and vaccination . . . Famous lives that ended before forty (due to preventable causes) . . . New books on health . . . Questions and answers.

In "School and Health" will be found:

Am I as a teacher a well adjusted person? . . . Health and safety suggestions for the school register . . . The health education program in the public schools of Baltimore . . . Practical hygiene in the junior high school . . . Safety games for Baltimore children . . . New health books for teachers and pupils.

HEALTH EDUCATION

The following have been reported in *Library Index*, National Health Library, 50 W. 50th St., New York, N. Y.:

Chamberlin, R. C., R.N. Teaching personal hygiene. *American Journal of Nursing* (New York City), 36:167–71, Feb., 1936.

Collins, L. B., and Welling, J. B. Educational services of the Detroit health education

club. *Journal of Health and Physical Education* (Ann Arbor, Mich.), 7:76–79, 120–21, Feb., 1936.

Cooper, Edith. The reaction of the education authorities, teachers, and parents to the teaching of biology and health education in the schools. *Health and Empire* (London), 10:320–23, Dec., 1935.

Harrington, M. H. Dental health week in Delaware. *Journal of the American Dental Hygienists' Association* (Stratford, Conn.), 10:10–15, Jan., 1936.

Holstrom, E. M., R.N. Dental health education. *Bulletin of the Iowa State Association of Registered Nurses* (Des Moines), No. 37:10–11, Sept., 1935.

DATES AHEAD

"Coming Conventions" as announced on the last page of every issue of the *Journal* merit attention for local press use. A request to national gatherings for information as to speakers and officers from your city and state may give usable information. And some of these conventions may have abstracts of addresses by home town people, or you may be able to secure abstracts direct. Your editors may be glad for information about the speakers.

In April the new Early Diagnosis Campaign gets under way. While this is primarily a project of tuberculosis associations there are angles of common interest for various types of health agencies. Further information from state and local tuberculosis associations.

April 12—When the first dispensary was opened in Philadelphia in 1786.

April 15—Organization of the National Child Labor Committee, 419 4th Ave., New York, N. Y.

April 25 to May 2—National Boys' and Girls' Week, 35 E. Wacker Drive, Chicago, Ill.

April 26 to May 2—Better Homes in America, Purdue University, West Lafayette, Ind.

May 1—One of our national moving days.

May 1—May Day and Child Health Day.

May 10—Mothers' Day, long a day of sentiment and flowers, is now becoming a day to emphasize "Make Maternity Safe." See Maternity Center Assn., 1 E. 57th St., New York, N. Y.

May 12—Birthday of Florence Nightingale, 1820.

May 12—National Hospital Day. Write to American Hospital Assn., 18 E. Division St., Chicago, Ill.

May 15—American Assn. of Medical Social Workers founded in 1918. Address: 18 E. Division St., Chicago, Ill.

May 18—World Good-Will Day. Consult Federal Council of Churches, 105 E. 22d St., New York, N. Y.

May 21—First Red Cross in the United States in 1881. Address: Washington, D. C.

May 24–30—National Conference of Social Work, Atlantic City, N. J. Write to 82 N. High St., Columbus, Ohio.

All of the above offer possibilities for presentation in staff meetings, of chances for good will greetings to executives of other agencies in your city or state, and of utilization in speeches or press material. Some of them will suggest active collaboration between health agencies.

Working details for some of them are given in "News Almanac for Social Work." Community Chests and Councils, 155 E. 44th St., New York, N. Y. *50 cents.*

Brief reports of what any one has done with any of the above dates will be welcome.

NEW

Bulletin, International Committee on Open Air Schools, 7 Freiligrathstrasse, Bielefeld, Germany. Five issues, largely for promotion of Third International Congress on Open Air Schools, 1936, are being distributed by the Office of Education, Washington, D. C.

Publication of *International Nursing Review* has been resumed by International Council of Nurses, 14 Quai Gustave Ador, Geneva, Switzerland. 8 Swiss francs per year.

FOR EDUCATION AND REFERENCE

"Catalog of 600 Books on Foods, Housing, Beverages, Management" is a classified bibliography which may be of use to camps, sanatoria, hospitals,

etc. Includes nationality cook books, diet and nutrition, housekeeping, etc. Probably includes fad books. Hospitality Guild, Stamford, Conn. *Free.*

"Caring for the Sick in the Home." John Hancock Mutual Life Insurance Co., Boston, Mass. 30 pages. *Free.*

Practical suggestions which will enable the attendant and the family to supplement most effectively the services of the visiting nurse, and to assist in giving the care according to the doctor's orders.

"The Facts About Certified Milk." American Assn. of Medical Milk Commissions, 1265 Broadway, New York, N. Y. *Free.* What, why and how. Our attention was directed to "the attractive typography and persuasive contents of this brochure."

"Health Publications of the American Medical Assn.," 535 N. Dearborn St., Chicago, Ill. *Free.*

Sex education . . . child welfare . . . health plays . . . nutrition and diet . . . nose, ear, throat . . . physical education . . . mental hygiene . . . dental hygiene . . . periodic health examinations . . . public health (communicable diseases; sanitation and hygiene) . . . health in education . . . conservation of vision . . . Hygeia . . . cancer . . . protection of research . . . miscellaneous . . . nostrum evil and quackery . . . Bureau of Medical Economics . . . medical education and hospitals.

"Helpful Information for Diabetics: An Authoritative Guide." 14 pages. Dept. of Health, New York, N. Y.

"Home Hygiene Classes in an Official Agency," by B. L. Cawthorn. *Public Health Nursing,* 50 W. 50th St., New York, N. Y. Nov., 1935. *35 cents.* Teaching "groups of mothers in selected districts to give care to the members of their own families and to help their neighbors in sickness."

A new series of illustrated questions and answers have been released beginning March 2. Good for newspapers and for house organs. *Free* from Health News Service, 22 E. 40th St., New York, N. Y.

"Pocket Caloric Index: To Aid in Gaining or Losing Weight," by E. B. Tietz. Reprinted from *Hygeia,* this 6 page, illustrated, stiff card folder is an ingenious device to help take the make believe out of gaining or losing weight. Given the number of calories daily, as physician directed, the folder makes it fairly easy to select food items, to decide upon quantities, and to keep track of the daily allowance. American Medical Assn., 535 N. Dearborn St., Chicago, Ill. *10 cents.*

"Pointers on Polio." A radio address, 2 articles, and a reading list. 11 pages. *10 cents.* American Medical Assn.

"Reading Ways to Health," by B. E. Schildwachter. The library in a sanitarium. *Hospitals,* 18 E. Division St., Chicago, Ill. Feb., 1936. *25 cents.*

Two to three sheet mimeographed releases, supplied by League of Red Cross Societies, 12, Rue Newton, Paris, 16, France:

Convulsions: . . . The food of the growing child . . . Carl von Linnè (Linnaeus, a pioneer of medicine).

"Wearing Glasses," by W. B. Lancaster, M.D. "Reasons for wearing glasses, common mistakes in the way glasses are worn, suggestions for their care." 23 pp. 21 illus. *10 cents.* American Medical Assn.

BOOKS AND REPORTS

A Review of Selected Books of Interest to Public Health Workers

Mazÿck P. Ravenel, M.D.

OUR review of books on public health presented last year after an interval of several years was received with sufficient enthusiasm by our readers to warrant repeating the survey this year.

The following recommendations and comments upon books published during 1935 are based chiefly on reviews in our *Journal*. The *British Medical Journal, The Lancet,* the *Journal of the American Medical Association,* and other magazines have been consulted, but it must be borne in mind that we avoid books on clinical subjects because our primary interest is public health.

THERE have been a number of small books and reports on the various phases of child health during the year, but few works of outstanding importance. Among those specially worth while is *Your Child Is Normal,* by Grace Adams, Covici-Friede, which covers the first 7 years of childhood. It can be thoroughly recommended to parents for their own benefit as well as that of their children. It is pleasingly written and easy to read. *The Mother's Encyclopedia,* compiled and edited by the Editors of the *Parents' Magazine,* Reynal & Hitchcock, is a real encyclopedia of 959 pages by some 130 authors. It contains a vast amount of useful information on bringing up children, and is commended by specialists. A report of the Committee on Maternal Welfare of the Philadelphia County Medical Society has been published, entitled *Maternal Mortality in Philadelphia.* This is an excellent study and concludes that the usual type of statistical study does not seem to be able to clear up the question of the relatively stationary figure at which maternal mortality stands. This report might well be classified differently in this review, but a study of it indicates that it is as important to the child as it is to the mother.

From children we more or less naturally turn to nursing. The year has brought out a number of very useful reports and books. *An Activity Analysis of Nursing,* by Ethel Johns and Blanche Pfeferkorn, is a report of the Committee on the Grading of Nursing Schools. It is particularly valuable for those interested in teaching and making curricula, but is useful for all who are in any way concerned with good nursing. *The Art and Principles of Nursing,* by Amy Elizabeth Pope and Virna M. Young, Putnam, deals largely with the technic of professional nursing. It is well done and is recommended to nurses as well as to physicians. *The Art of Public Health Nursing,* by Edith S. Bryan, Saunders, is a book of which it is hard to say too much in praise. It is recommended not only to public health nurses, but to all women in the nursing field. An excellent report has been given on the grading of nursing schools

called, *Nursing Schools—Today and Tomorrow,* which discusses the faults which may be found with our present schools, what we should expect of the professional nurses, why there are so many unemployed nurses, etc. This report is recommended not only to nurses and physicians, but to all public health workers who of necessity come into contact with the problems here discussed. Nurses for some time have been feeling the necessity of knowledge of psychology and mental hygiene. *Introduction to Psychology,* by Edward S. Robinson and Virginia Kirk, Macmillan, written with special applications to nursing and nursing interrelationships, has been designed to fill this need. There have been a number of new editions of books for nurses which have stood the test of time and criticism. *Nursing Mental Diseases,* by Harriet Bailey, Macmillan, 3rd edition, is most highly recommended, the author having had many years' experience with this branch of her profession. *Communicable Diseases for Nurses,* by Albert G. Bower and Edith B. Pilant, Saunders, 3rd edition, is highly recommended. *Medical Diseases for Nurses,* by Arthur A. Stevens and Florence Anna Ambler, Saunders, 2nd edition, is also commended.

The year has seen a number of excellent books on nutrition, a subject which for some years has been attracting more and more attention. *Your Meals and Your Money,* by Gove Hambidge, McGraw-Hill, is a popular presentation of diets as related to income, built on data obtained largely from the workers in nutrition of the U. S. Department of Agriculture. It is authoritative and written in pleasing style. *Diet and Physical Efficiency,* by Howard W. Haggard and Leonard Greenburg, Yale University Press, is an excellent study of the question of fatigue from the nutritional standpoint, which the authors measure from the respiratory quotient. It is adapted to general readers as well as those who have more special training. *Nutrition and Physical Fitness,* by L. Jean Bogert, Saunders, has reached its 2nd edition. The information it contains is useful and reliable as far as nutrition goes, but it says little about physical fitness. It is written in such terms as to make it useful to the laity as well as to nurses and student dietitians. *Child Nutrition on a Low-Priced Diet,* by Mary Swartz Rose and Gertrude M. Borgeson, Columbia University Press, is an excellent study and merits careful consideration, being of interest in child development. Mrs. Rose needs no introduction, and her name alone speaks for the value of this book. *The Vitamin B Requirement of Man,* by George R. Cowgill, Yale University Press, is a scholarly, though somewhat technical, study of experimental, mathematical, and historical researches on vitamin B and beriberi. *Nutrition Work with Children,* by Lydia J. Roberts, University of Chicago Press, is a revised edition. The original work appeared some 9 years ago and has been a standard reference through the years. This book is especially valuable in that more than half of it is given to prevention and treatment. It will doubtless hold its place as a standard reference until another edition appears. In June, 1935, the *Quarterly Bulletin of the Health Organisation, League of Nations,* published a report by Et. Burnet and W. R. Aykroyd, on *Nutrition and Public Health,* which is very interesting, and is addressed primarily to public health authorities. It is comprehensive, including discussion of dietary standards, food supply, differences in dietary habit, and their effect on nutrition. It gives a strong plea for education in nutrition and gives examples of public health nutrition

work. The opinion of an expert is: "Never before has so much of interest regarding nutrition and public health been brought together in such a readable form."

For the past 3 years amebiasis has attracted much attention. A masterly book, *Amebiasis and Amebic Dysentery,* by Charles F. Craig, Thomas, is of more than usual importance. No one anywhere is more entitled to write on this subject than the author. He has given us an excellent discussion of the history, epidemiology, incidence, life cycle of the endameba, and methods of transmission. It is hard to recommend this book too highly. Sharing with amebiasis in attention is infantile paralysis. *Poliomyelitis: A Handbook for Physicians and Medical Students,* by John F. Landon and Lawrence W. Smith, Macmillan, though small, covers the ground in excellent fashion. It claims only to be a summary for practical use and can be heartily recommended. Another excellent study is *Infantile Paralysis,* by George Draper, Appleton-Century. This is a summary written for the layman. It emphasizes the importance of consulting a physician at the onset of any suspicious symptoms. It is also a useful book for the physician and the medical student, as it gives the points on which the laity wishes information in direct and simple language.

The study of allergy has not given rise to as many books this year as might have been expected. The phenomenon is still attracting much attention and our knowledge of the extent of its influence seems to be broadening, but no new work has come to our attention. New editions of two books on the subject have come out: *Allergy and Applied Immunology,* by Warren T. Vaughan, Mosby, is a classical, readable study, which can be highly recommended as a safe and sound guide for the general practitioner. *Recent Advances in Allergy,* by George W. Bray, Blakiston, is one of the most complete and well written reviews which have appeared. Both of these books represent not only a study of the literature, but a large experience.

Mental hygiene is generally regarded as an abstruse specialty. It is a difficult subject but books are appearing which should be read by the average practitioner and even by laymen. Certainly every physician and health officer comes across cases which can be understood thoroughly only through the study of mental hygiene. *Mental Hygiene for Effective Living,* by Edwin A. Kirkpatrick, Appleton-Century, is intended to familiarize the uninitiated with the meaning of mental hygiene. The author approaches the subject through an understanding of what is normal. He makes the mistake of overemphasizing the ease with which the principles of mental hygiene may be applied. It is, however, a commendable book. *Psychology and Health,* by H. Banister, Macmillan, has many excellent features. It will be of service to health officials, though not to the extent which might be wished. It is evident that public health service would be improved if individual citizens understood the relation of sentiment to socially approved activity. The book shows that there is a definite hazard to the well-being of the general public as a result of the incidence of mental instabilities and psychiatric disorders. The improvement in mental health of individuals will lighten the tax burden and diminish the tension of living which are subversive of group welfare. *Training in Psychiatric Social Work at the Institute for Child Guidance,* by Sarah H. Swift, the Commonwealth Fund, is a good description and discussion of the psychiatric social work training program at the Institute for Child Guidance, New York City, during the years 1927

to 1933. *Making Our Minds Behave*, by William S. Walsh, Dutton, has many good features. The author is a successful writer with a marked ability to use easy American vernacular. He gives much sound and sensible material in interesting style. *Keeping a Sound Mind*, by John J. B. Morgan, Macmillan, is an excellent presentation of material to aid the student in establishing desirable mental and emotional habits and acquiring the right attitude toward life.

A number of extremely interesting historical books have appeared. *A Short History of Some Common Diseases*, by divers authors, edited by W. R. Bett, Oxford University Press, is described as an original venture in medical literature, which it is. In spite of some errors, it is extremely interesting and useful. Biographies of great medical men necessarily contain much medical history, and this is true of *The Life of Sir Robert Jones*, by Frederick Watson, Wood, a story of a great man whose gifts were recognized during his life. He was known in this country almost as well as in England. A book which is philosophical and has been a best seller is *Rats, Lice and History*, by Hans Zinsser, Little Brown. It is the result of philosophical musings, laboratory experiments and a wide experience in studying contagious diseases, especially typhus. A thoroughly delightful book is *Memoirs of a Small-Town Surgeon*, by John Brooks. Wheeler, Stokes. In addition to the great interest which attaches to biographies as such, this book gives a wonderful picture of the old Massachusetts General Hospital and the very unusual group of men who were teaching at Harvard about 1880. A less complete story but also most interesting is told of the famous teachers under whom the author worked later in Europe after leaving Boston. It is one of the most delightful books which have come to the reviewer's desk during the year. A book which can be praised most highly is *Some Notable Epidemics*, by H. Harold Scott, Wood. Not only is this book delightful as history, but is useful as a study of epidemiology. Another biography which contains a vast amount of medical history is *Fifty Years in Public Health: A Personal Narrative with Comments*, by Sir Arthur Newsholme, George Allen & Unwin, Ltd. An unusual book is *The Story of Medicine in the Middle Ages*, by David Riesman, Hoeber. This scholarly work leaves one with a different impression of medicine in what has been called the Dark Ages. Few of us realize the enormous amount of good which was done during this period. *The Advance of Science*, edited by Watson Davis, Doubleday Doran, is a more or less contemporary history covering a vast field which is taken care of from week to week in the *Science News Letter*. It is an excellent book to have on one's shelf for reference.

There have been a number of new editions or books on bacteriology, but only one new text. Among the notable new editions is *A Textbook of General Bacteriology*, by Edwin O. Jordan, Saunders, which has reached its 11th edition, and maintains the high standard set by its predecessors. Portions of it have been largely rewritten and all of it has been brought up to date. *Handbook of Bacteriology*, by Joseph W. Bigger, Wood, has reached its 4th edition. It is one of the best of the handbooks and has evidently filled a need. A new type of book on bacteriology is *Agents of Disease and Host Resistance, Including the Principles of Immunology, Bacteriology, Mycology, Protozoölogy, Parasitology and Virus Diseases*, by Frederick P. Gay and Associates, Thomas. This is a monumental work and the material is given in an interesting and well organized fashion.

Not many books have appeared on epidemiology. A notable one, *Epidemics and Crowd Diseases*, by Major Greenwood, Macmillan, is called an introduction to the study of epidemiology, but apparently intended for the laity. It is delightfully written, rich in classical allusions, gives much history, and can be highly recommended not only for its erudition, but for its general interest. *A Geography of Disease*, by Earl Baldwin McKinley, George Washington University Press, is a laborious compilation of geographical incidence of diseases arranged by countries. It is most valuable for the purpose intended, and was issued as a supplement to the *American Journal of Tropical Medicine* by Williams and Wilkins.

A notable event of the year was the appearance of *Sedgwick's Principles of Sanitary Science and Public Health*, by Samuel C. Prescott and Murray P. Horwood, Macmillan. While it does not and cannot replace the original text, it is a well done piece of work and deserves success. *Preventive Medicine and Hygiene*, by Milton J. Rosenau, Appleton-Century, has come to its 6th edition and is extensively rewritten. While it still has some of the deadwood which the author claims to have eliminated, it is a most valuable text, and will undoubtedly retain the position it has held for so long. *Twelve Hours of Hygiene*, by F. L. Meredith, Blakiston, is a book designed for a one hour course for college freshmen. It contains much useful material and is good for ready reference. *A College Textbook of Hygiene*, by Dean F. Smiley and Adrian G. Gould (rev. ed.), Macmillan, has been very favorably reviewed. It is an attractive text, but rather rudimentary for college students. *The Principles of Preventive Medicine*, by Hutt and Thompson, Methuen, comes to us from England in two volumes. This is a sound and comprehensive treatise written in the best English manner and can be highly recommended for advanced students. *Personal and Community Health*, by Clair E. Turner, Mosby, has reached its 4th edition. It has been considerably enlarged and brought up to date. It can be recommended for college level groups.

The Principles and Practice of Medicine, by Sir William Osler; revised by Thomas McCrae, Appleton-Century, has enjoyed an unprecedented popularity since 1892, when the first edition was published, and the appearance of this revision is an event in medical circles. We believe that every health worker should have a good book on medicine at hand and know more about actual disease. *Dynamics of Population*, by Frank Lorimer and Frederick Osborn, Macmillan, covers a wide field of especial interest to sociologists. It is useful reading, but rather heavy unless one is a specialist. *The Theory of Play*, by Elmer D. Mitchell and Bernard S. Mason, Barnes, appeared first in 1923 as "The Theory of Organized Play." It has been entirely rewritten and as it now appears is the most thorough and interestingly written treatise on the theory and administration of play. It is designed especially for educators. *Stand Up and Slim Down*, by Ettie A. Hornibrook, Doubleday Doran, is a worthwhile book for laymen and physicians, considering as it does, a number of the subjects often discussed by persons without much knowledge of the fundamental facts. *Medicine Marches On*, by Edward Podolsky, Harper, is an interesting book containing a large amount of information correctly, though rather sensationally, given. It has value in that it will bring those who will not ordinarily read medical literature to an understanding of many useful facts, in spite of its style not being such as we care for. A most useful book for all public health workers is *Social Work Year Book*, 1935, edited by Fred S. Hall, Russell Sage Founda-

tion. It covers practically every phase included under public health work. It is an invaluable reference book, giving correct information on the numberless existing agencies, with the names and addresses of the executive directors. A curious book, the result of deep thinking by a number of well known men, is *The Frustration of Science*, by 7 authors; foreword by Frederic Soddy, Norton. It is, we hope, unduly pessimistic, but certainly makes one think. *Heredity and Disease*, by Otto L. Mohr, Norton, is the outcome of a series of lectures given by this distinguished Swedish geneticist at Harvard in 1933. It is deep reading on an interesting and important subject, and forces the conclusion that the day is past when environment can be excluded from the discussion of heredity as far as human affairs are concerned.

Fundamentals of Dairy Science, by Associates of Lore A. Rogers, Reinhold Publishing Corp., has reached its 2nd edition. The first met with a warm reception, and there is no doubt that the second will be similarly welcomed. We have not received any books on housing, as such, though this matter is being much discussed in every country. *The Housing Program of the City of Vienna*, by Charles O. Hardy and Robert R. Kuczynski, the Brookings Institution, is a presentation of one of the most remarkable social experiments of modern times. It should stir all health workers in this country. The question of water supplies is treated constantly in textbooks on bacteriology, engineering, etc. The journals have many articles approaching the subject from its various aspects. One notable book, *Swimming Bath Water Purification*, by Wilkinson and Forty, 2nd edition, Contractors' Record, Ltd., has appeared, which in the opinion of the reviewers, is better than anything on this subject which America has yet produced. *Elementary Human Anatomy, Based on Laboratory Studies* by Katharine Sibley, Barnes, is written especially for students of physical education, and is a real contribution to educational aids for the special group for whom it is designed.

There is a group of books on subjects constantly under discussion not only from the medical and public health standpoints, but by sociologists and philanthropists. *Drugs Against Men*, by Henry Smith Williams, McBride, is an excellent exposition of the subject. Though it deals in facts, we cannot help feeling that it draws a slightly exaggerated picture. *What About Alcohol?* by Emil Bogen and Lehman W. S. Hisey, Angelus Press, is a strong book, one which is now being pushed by certain organizations for use in schools. It is one of the best of its class, but in the opinion of the reviewer, is strongly tinctured with exaggeration. *A New Deal in Liquor: A Plea for Dilution*, by Yandell Henderson, Doubleday Doran, gives a considerable amount of useful history as well as scientific facts concerning alcohol and its effect on the human body. There is also an interesting discussion on the use of euphorics, such as tea, coffee, chocolate, etc., and alkaloids. The main thesis of the book is that alcohol should be taken in dilute form. *Science and the Public Mind*, by Benjamin C. Gruenberg, McGraw-Hill, is an account of an investigation into the place of science in relation to adult education and how activities in that field should be stimulated. It is written in a clear, crisp and interesting style, and can be commended. An excellent book by one of the best writers on biology, unfortunately now dead, is *Biology for Everyman*, by Sir J. Arthur Thomson, Dutton. We know of no one who has written more delightfully on biological subjects than the author, who did much to popularize the subject and to combat the narrow mindedness which

brought about the disgraceful trial of a young teacher in Tennessee. *What You Should Know About Heart Disease,* by Harold E. B. Pardee, Lea & Febiger, has reached its 2nd edition, which speaks for its usefulness. It is written in a helpful and optimistic tone which will bring comfort to many. It is designed chiefly for laymen and is a valuable contribution in a limited field. As an aid to the understanding of a much discussed, yet unsettled, subject, *Lactobacillus Acidophilus and Its Therapeutic Application,* by Leo F. Rettger, Maurice N. Levy *et al.,* Yale University Press, is useful and should be mentioned. The book contains so much of interest as to well repay the reader. *Standard Classified Nomenclature of Disease,* edited by H. B. Logie, 2nd ed., Commonwealth Fund, is an aid in the bookkeeping of public health. The index has been installed in more than 120 hospitals, and 27 national organizations have approved it. It contains more than 15,000 items.

The following are worthy of brief mention by title and author because of their acceptance as indicated in the numbers of copies ordered by members through the Association's Book Service: *Physical Defects—The Pathway to Correction,* American Child Health Association; *Big Problems on Little Shoulders,* by Carl Renz and Mildred Paul Renz; *Common Sense for Mothers,* by Mrs. John S. Reilly; *Health Dentistry for the Community,* Edited by Michael M. Davis; *Health Education in Senior High Schools,* by Dorothy Ruef; *Modern Motherhood,* by Claude Edwin Heaton; *Recording of Local Health Work,* by Carolina R. Randolph and W. F. Walker; *Methods and Materials of Health Education,* by Fannie B. Shaw and Jesse Feiring Williams.

In the advertising pages of this *Journal* eleven publishers have taken space to announce books they believe will interest our readers. Some have been or will be reviewed in this *Journal.* Attention to them is invited.

Injury and Incapacity—*By H. Ernest Griffiths, M.S. (Lond.) F.R.C.S. Baltimore: Wood,* 1935. 270 pp. Price, $5.00.

The present work was written with special reference to industrial insurance. The author has investigated a large number of cases and traced them from the date of injury to the time of resumption of full work. In this, he has differentiated between the opinion expressed by a surgeon to a hospital, which usually gives a much more favorable prognosis than does the man's own panel doctor who is confronted with the length of time before the man ultimately resumes his work.

The book aims to establish a basis for estimating the probable period of incapacity for any given injury, in any particular patient, having regard to his present employment and his ability to earn in another employment. Some 50,000 consecutive cases of accidents obtained through courtesy of a large insurance company, having cases all over the British Isles, and the author's personal study of some 15,000 cases, form the basis of the discussions.

Operations for the physical requirements of workmen have been classified into 24 types, and, in indexing, a thousand or so occupations show which operations come under each of the types. Thus Type 1 is "heavy, laborious work," for which the physical requirements of the workman, as related to each important part of his body, are laid down—hands, thumb, fore-arm, feet, ankle joint, spine, abdomen, vision, nervous system, etc.

The disabilities following injuries to various parts of the body are divided into 12 chapters which comprise 193

pages. A thorough subject index accompanies. There are no illustrations. Descriptions are tersely given and very well captioned and sub-headed, so that perusal is easy and the chief facts are readily gleaned. The average period of incapacity at different ages of life, and for both heavy work and light work, is given in 90 short tables integrated with the subject matter throughout the book. Only limited consideration is given to females.

To anyone interested in the subject of capacity, incapacity, compensation, and physical types of workmen, and especially surgeons, general practitioners who necessarily encounter surgical mishaps, claims adjusters, medical economists, etc., this would appear to be an indispensable volume. Much is said about preferred methods of treatment.

EMERY R. HAYHURST

Lobar Pneumonia and Serum Therapy—*By Frederick T. Lord, M.D., and Roderick Heffron, M.D. New York: Commonwealth Fund, 1936.* 80 pp. Price, $1.00.

The Commonwealth Fund has rendered a distinct service in publishing this brochure. It is dedicated to the late Dr. George H. Bigelow, who initiated these studies in 1931. The writer once heard the late Sir William Osler, in a public address, say that we were able to cure no greater number of pneumonia cases today than were cured in the time of Hippocrates. It is gratifying to know that this is no longer true.

The serum treatment of pneumonia began in Germany with the experiments of Neufeld and Händel, in 1910. Cole and Dochez, in 1913, were the first in the United States to use it. It was unsatisfactory until 1924, when Felton's method of concentration of sera was introduced. Most of these concentrated sera for Types I and II are bivalent.

We now recognize some 32 types of pneumococcus, but 96 per cent of all cases of lobar pneumonia are due to the pneumococcus, and Types I and II produce approximately one-half of these cases. The death rate averages 25 per cent when the infection is due to Type I, and 41 per cent when due to Type II. The use of the appropriate serum has reduced the mortality in Type I cases to 11 per cent and Type II cases to 27 per cent.

At the beginning of the Massachusetts study it was advised that serum treatment be begun on all cases as soon as the clinical diagnosis was made, but it is now recommended that typing should be done, since the patients may be given a serum which is not specific and at the same time may sensitize them. However, the danger of serious allergic reaction is believed to be exaggerated. In 956 cases treated in Massachusetts, there were 4 deaths due to the use of serum, of which only 1 was due to an allergic reaction and 3 to thermal reactions. We are advised to take precautions against allergic manifestations by studying the history and giving eye and skin tests for sensitivity to horse serum. Unfortunately, it is not practical to give the benefits of specific treatment to children for reasons which are detailed. The different methods of typing are described, and that of Neufeld is generally preferred.

A short appendix gives the details of the Massachusetts cases. While this brochure contains only 80 pages of text, every page has great value and we wish that it could be put into the hands of every practising physician.

MAZŸCK P. RAVENEL

Vitamins in Theory and Practice —*By Leslie J. Harris, D.Sc., Nutritional Laboratory, University of Cambridge, England. New York: Macmillan, 1935.* 240 pp. Price, $3.00.

This book comprises the subject matter of 4 popular lectures given at the Royal Institution in London in 1934. The purpose of the lectures was to present in a popular fashion the main facts known about vitamins (those for a long time elusive minute constituents so essential to growth, function, and freedom from disease, but now being analyzed in the laboratory and more definitely classified).

The small book gives a historical sketch of the discovery of the vitamins, a description of the known vitamins, A to E, with a brief discussion of the diseases resulting from a deficiency of them. There are also set forth the articles of diet as well as other contributory factors which furnish the essential vitamins to promote health and prevent deficiency diseases. Chapter XI of the book treats of Dietetics and indicates how corrections may be made in ordinary diets to offset or cure deficiency diseases.

The writer shows familiarity with the work and writings of those who made possible our knowledge of vitamins, and the data set forth are in line with the latest accepted theories and known facts in regard to them.

The book is well printed, indexed and illustrated. JAMES WALLACE

Child Psychiatry—*By Leo Kanner, M.D., with prefaces by Adolph Meyer and Edward A. Park. Springfield, Ill.: Thomas,* 1935. 527 pp. Price, $6.00 postpaid.

This is an encyclopedic treatise in a field which is coming more and more to the attention of the general practitioner and the pediatric specialist. It is the first book in the English language to cover comprehensively the many phases of the child's personality from the objective standpoints of psycho-biology and psycho-pathology of childhood.

The material is based upon a wealth of experience of the author in studying large numbers of children at the Harriet Lane Home for Invalid Children, the Pediatric Department of the Johns Hopkins Hospital, and the Henry Phipps Institute of Psychiatry. The whole child in his many relationships is under consideration.

The book affords the pediatrician a method of approach to the personality disorders of childhood and gives him an insight into the problems arising within both the child and his environment. One wishes that as much attention had been given to treatment from the child guidance standpoint as to the diagnosis and pathology of childhood disorders. RICHARD A. BOLT

Length of Life—*By Louis I. Dublin, Ph.D., and Alfred J. Lotka, D.Sc. New York: Ronald Press Co.,* 1936. 400 pp. Price, $5.00.

This valuable book presents in nontechnical fashion the more important and interesting facts and relationships derived from life tables of different times and places, and from associated information.

After a general discussion of the age span, containing such interesting references as that to Drakenberg, who, according to seemingly reliable records, died at the age of 141 years, the book proceeds to a brief explanation of the elements of the life table: survivors, deaths, death rates, expectation of life, and auxiliary data.

Time changes in the length of life are traced, beginning with the fragmentary data of pre-Christian Egypt and Rome, where the expectation at birth was perhaps 20 to 30 years, down to 1929–1931, when the calculated expectation in the United States was 59 years for males and 63 for females.

Under "Biological Aspects of the Life Table" are discussed mainly qualitative changes in mortality, such as the shifting preponderance of specific

causes of death with varying age, time, and rate of natural increase of the population. While the campaign against degenerative diseases is not disparaged, the increase in mortality from these diseases is properly termed an "honorable defeat," since these ailments reflect in large measure the normal wearing out of bodies preserved from more preventable death during the earlier years of life. [Moreover, since old persons are no longer permitted to die of old age, they must of necessity turn to mortality rubrics still countenanced.]

A brief discussion of inheritance and longevity summarizes researches indicating that longevity is strongly influenced by heredity. The authors contend, however, that "the increase in longevity attainable by effective use of existing resources in the control of the environment still exceeds by a good margin the difference in longevity between the most favorable and the least favorable heredity groups" in the study cited. In a review of the contribution of medical science, a new edition is presented of Dublin's hypothetical life table, originally published in 1928; the anticipated expectation of life at birth is, in this book, increased from the earlier estimate of 64.75 years to 69.93—practically, the biblical three score years and ten.

Longevity is next considered in relation to physical impairments and occupation. The professional groups appear to have hardly half the mortality of unskilled workers, even after age-adjustment of rates. Physicians have above average mortality. Airplane pilots on schedule flying have a fatal accident rate of 25 per 1,000—6 times the general mortality of males of like age!

A chapter on Application to Population Problems outlines the meaning of "true" birth and death rates, as defined by Lotka, and shows how the "true" rate of natural increase is hardly half the crude. The authors estimate that in 1920 the natural increase was 5.4 per 1,000 population; in 1930, 2.8; in 1933, minus 2.06; and in 1934, minus 0.6. In other words, the birth and death dates of the latter 2 years have operated toward a declining population. On the basis of stated assumptions, the authors forecase a maximum population for the United States of 154 millions, to be attained about 1990.

The rest of the book is devoted to applications of the life table to economic problems (life insurance, economic value of the wage earner, and replacement of industrial equipment) to insurance life tables, and to the technic of life table construction.

An extremely useful feature of the book is found in the Appendix, which gives 32 pages of life tables. These, with the text tables, provide "what is probably a more extended collection of life tables than can be found in any other single source." In the list are about 50 original tables for the United States and for individual states based upon the 1930 census, including a few for colored, urban, rural, and a series for foreign countries, some as recent as 1930–1933!

In the opinion of the reviewer, certain geographic differences are taken somewhat too seriously in the book. It is believed that the urban-rural contrasts may be misleading to some readers, in spite of the qualification made in the case of cancer, that "the urban excess may be more apparent than real." The implication on page 96 (and a less specific statement in paragraph 3 of page 100) that in the U. S. Registration Area, the age compensated urban mortality is 31 per cent in excess of the rural has a dubious foundation in the absence of more general intra-state residence allocation. The apparent rural advantage arises

largely from low rural rates recorded in southern states and in other states recently admitted to the registration area, where crude rural death rates run as low as 5 and 6 per 1,000—half the urban rates, or even less. (See, for example, Oklahoma, Arizona, and South Dakota in Table I, *U. S. Mortality Reports*, 1932.) Whether the very low rural death rates in these states imply incomplete death reporting or merely the absence of rural hospital facilities is difficult to say; nevertheless, the favorable expectations of life, as calculated for some of these states, probably require further justification.

In general, however, any flaws which one might pick in this book are trivial in relation to the value of the book as a whole. Everyone with a broad interest in public health or demography should read it. The achievement of the authors in presenting a technical subject soundly, in language understandable to persons of moderate intelligence and education, will best be appreciated by those who have examined the original publications underlying the book. A. W. HEDRICH

Foods and Beverage Analyses—*By Milton A. Bridges. Philadelphia: Lea and Febiger,* 1935. 246 pp. Price, $3.50.

This book of special value to physicians, dietitians, and students of nutrition will be welcomed by all who want reliable and up-to-date data on the composition of foods and beverages. The tabular material covering nutritive, mineral, and vitamin values and alcoholic analyses is the most complete that has ever been published in a concise and usable form. For the first time there have been gathered together data regarding the analyses of commercial canned and packaged foods. A large staff of assistants and investigators have searched international records, and where data on common foods were lacking original analyses have been made. Analyses of well known commercial products have been obtained through contact with the manufacturers.

The first six chapters, including 39 pages, are largely descriptive, covering briefly proteins, fats, and carbohydrates, giving their properties, utilization, nutritive requirements, and deficiencies and sources. They also include tables giving the water and cholesterol content of common foods, caloric requirements, and average height-weight data. Chapter 7, including nearly half of the book (116 pages), consists of a table giving the carbohydrate, protein, fat, and caloric value of the most comprehensive list of both natural and manufactured foods ever published. A unique feature of this and other tables in the book is the presentation not only of the percentage composition, but also of the number of grams of each element in the average portion of food served as designated in common household measures. Chapters 8 and 9 (12 pages) give in a similar way the analyses of special dietetic foods and strained foods. Chapters 10 to 12 (30 pages) are devoted to the inorganic constituents of foods. Brief descriptive paragraphs are given on the properties, requirements, utilization, and sources of mineral elements, and acid-ash and alkaline-ash foods. A table gives the percentages and grams, in average served portions, of calcium, phosphorus, iron, copper, manganese and chlorine in over 440 foods. The iodine content of a large number of foods is given in a separate table of 8 pages. The remainder of the book is devoted to vitamins, and the composition and fuel value of alcohol beverages, together with the qualitative ingredients of various common mixed alcoholic drinks.

An extensive bibliography as late as of July, 1935, is appended.

D. BREESE JONES

Principles of Hygiene—*By Thomas A. Storey, Ph.D., M.D. (rev. ed.) Stanford, Calif.: Stanford University Press,* 1935. 524 pp. Price, $3.50.

This book is a revised edition of the one issued in 1924 and, as the writer states, most of the chapters have been rewritten. This work differs from most books on hygiene as in the words of the author it deals with "the principles of hygiene." A better title might be one which would suggest that it deals with the factors which provide the background for hygiene. The author has in preparation a volume on the practice of hygiene, and, as he says, the present volume deals with the principles of constructive hygiene and of defensive hygiene, the principles on the one hand which influence production, improvement and maintenance of health, and those on the other which regulate the defense of health and prevention of disease.

In summing up these factors the author covers a wide field of embryology, physiology, biology, anatomy, bacteriology, and heredity, the last named being discussed at considerable length. The writer is prone to divide and subdivide his subject, perhaps for the convenience of his students. Hygiene as a whole he divides into autonomic and voluntaristic, the former being represented by reflexes and animal instincts for self preservation and the latter by conscious effort to promote as well as preserve health. The voluntaristic is becoming more and more scientific in character. The principles of constructive hygiene are enumerated as reproduction, heredity, nutrition, excretion, exercise, rest, and environment. Defensive hygiene may be autonomic or voluntaristic, as it is constituted by the influences which have to do with the defensive hygiene of heredity and those which protect good heritage and prevent injury and disease.

The book is valuable for those (particularly students) who wish to acquaint themselves with the underlying bases of hygiene; its appeal, however, to the readers of popular information on hygiene will likely be limited.

JAMES WALLACE

Medical Mycology: Fungous Diseases of Men and Other Mammals —*By Carroll William Dodge. St. Louis: Mosby,* 1935. 900 pp. Price, $10.00.

Recent years have brought a greatly increased interest in the infectious diseases of man caused by fungi higher than the bacteria, as evidenced by a marked increase in the literature dealing with this subject. Much of this literature is confusing because the authors are medical men who have not given sufficient consideration to the identification or nomenclature of the organisms with which they are dealing, or mycologists who have not sufficiently considered the evidence regarding the pathogenicity of the organisms they are describing. There has been such an eagerness to discover new species of pathogenic fungi that a common sense attitude toward taxonomy has often been lacking and Koch's postulates have often been ignored. As a result, the journal literature dealing with medical mycology is almost useless to all but specialists in this field of science, and a comprehensive work which would integrate and interpret this literature would be of great value in the clinical laboratory.

The present work only partly serves this purpose. The author, a distinguished mycologist, has laboriously prepared a most comprehensive summary of the now quite extensive literature. He deals almost exclusively with the mycological aspects, barely touching upon the medical, and is concerned primarily with questions of classification. He presupposes a knowledge of general mycology on the

part of the reader, the introductory chapter being too brief and condensed to provide a proper background for what follows. The author is a "splitter" as far as classification is concerned, and by accepting large numbers of "species" which have been separated by very slight or obviously variable characters, by creating a number of new genera and new combinations, he has aggravated rather than improved a situation which is rapidly becoming intolerable.

Nevertheless this book will be of inestimable value as a reference work for the specialist or serious student of medical mycology. It provides a complete and well arranged list of all of the fungi reported as pathogenic to man, with their descriptions, and a bibliography which must be almost complete, covering as it does the rich Italian and Spanish literature, which is not available to most of us, as well as the usual German, French, and English. Disagree as one may with the nomenclatures and classifications adopted, he will find it necessary to keep this book on his desk.

ARTHUR T. HENRICI

The Facts About Certified Milk —*American Association of Medical Milk Commissions. 1265 Broadway, New York City*, 1936. 15 pp. Free.

This very attractive brochure describes the origin and development of certified milk, outlines the requirements for its production, discusses pasteurization of certified milk and vitamin D certified milk, and gives a list of cities where this superior grade of milk may be obtained. Every health officer and all persons interested in milk sanitation will find this pamphlet worthy of perusal.

J. A. TOBEY

Living Along With Heart Disease —*By Louis Levin, M.D. New York: Macmillan*, 1935. 126 pp. Price, $1.50.

This short treatise is, as its title implies, written for the use of the layman. It covers, in interesting simple language, a discussion of such factors as the fear of heart disease, the definition and types of heart disease, and special discussion of such types as "leaky" hearts, myocarditis, hypertension. It discusses heart pain, the general treatment in a non-medical way, and concludes with sections on questions and answers, and on the "philosophy" of heart disease.

An interesting, informative, and worth while discussion.

CHARLES H. KEENE

BOOKS RECEIVED

WHY KEEP THEM ALIVE? By Paul deKruif. New York: Harcourt Brace, 1936. 293 pp. Price, $3.00.

AMERICAN CHAMBER OF HORRORS. By Ruth deForest Lamb. New York: Farrar & Rinehart, 1936. 418 pp. Price, $2.50.

ELEMENTARY BACTERIOLOGY. 3rd ed. By Joseph E. Greaves and Ethelyn O. Greaves. Philadelphia: Saunders, 1936. 562 pp. Price, $3.50.

INTRODUCTION TO HUMAN PARASITOLOGY. By Asa C. Chandler. 5th ed. New York: Wiley, 1936. 661 pp. Price, $5.00.

DOCTOR OF THE NORTH COUNTRY. By Earl Vinton McComb. New York: Crowell, 1936. 238 pp. Price, $2.00.

HEALTH—HAPPINESS—SUCCESS SERIES. By William E. Burkhard, Raymond L. Chambers and Frederick W. Maroney. New York: Lyons & Carnahan, 1936. Health by Doing. Fourth Grade Text. 314 pp. Price, $.57. Building for Health. Fifth Grade Text. 309 pp. Price, $.57. The Body and Health. Sixth Grade Text. 313 pp. Price, $.57.

THE TRUE PHYSICIAN. THE MODERN "DOCTOR OF THE OLD SCHOOL." By Wingate M. Johnson. New York. Macmillan, 1936. 157 pp. Price, $1.75.

THE TUBERCULIN HANDBOOK. By Halliday Sutherland. New York: Oxford, 1936. 96 pp. Price, $2.75.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Foods that Fight—We who believe that any food fit to eat is fit to eat in combination with any other food will be interested in this British discussion of "compatibilities." All the old-granny ideas about milk and fruit, etc., are dragged out and discussed with due solemnity. That the conclusion finally reached is that there is no scientific basis for the superstitions will be lost upon the faddist who will assume where there is such a dense smoke raised by food quacks there must be some fire, despite the tone of this article.

ANON. The Compatibility of Foods. J. State Med. 44, 2:103 (Feb.), 1936.

What to Do With Our Chronic Sick?—Recent state surveys show that 1 of 10 in the population, and nearly 1 of 3 of those over 40 years of age, suffer from some chronic disease. Most communities have inadequate facilities for their care, and they are found scattered about in many institutions. The author discusses the rôle of out-patient clinics, need for special hospitals for care and study of chronic illness, the types of patients best cared for at home, and suggests the necessity for community planning if wise care for all and economical use of community resources are to result.

BOAS, E. P. A Community Program for the Care of the Chronic Sick. Hospitals. 10, 2:18 (Feb.), 1936.

Problem Drinkers—A discussion of the effect of excessive drinking on different types of people and of the treatment necessary to bring about a change of habits. Case studies are given to illustrate the author's points. This is condensed from a book in preparation.

DURFEE, C. H. Understanding the Drinker. Ment. Hyg. 20, 1:11 (Jan.), 1936.

Diphtheria Immunization Abroad—Further success with toxoid immunization in British health districts confirms experience here.

CHESNEY, G., and PARISH, H. J. Alum-Precipitated Toxoid in Diphtheria Immunization. Brit. M. J. 3917:208 (Feb. 1), 1936.

Psychiatric Clinics—The annual directory of psychiatric clinics in the United States prepared by the National Committee on Mental Hygiene lists the clinics available in each state, the location of each, the name of the director, the personnel composing the clinic staff, and the time of weekly clinics.

CLARK, M. A. Directory of Psychiatric Clinics in the United States, 1936. Ment. Hyg. 20, 1:66 (Jan.), 1936.

About Undulant Fever—A member of the original "Mediterranean Fever Commission" gives some interesting sidelights on the history of undulant fever abroad and here, reporting an increase in the disease in England. The author quotes 20 per cent as the incidence of infection among cows in Great Britain.

EYRE, J. Undulant Fever. J. State Med. 44, 2:64 (Feb.), 1936.

Arguments for Diphtheria Immunization—Canadian experience indicating the value of diphtheria prophylaxis is reported upon.

FITZGERALD, J. G. Diphtheria Prevention, Methods and Results. Canad. Pub. Health J. 27, 2:53 (Feb.), 1936.

Vaccination Against Infantile Paralysis—In North Carolina 1,400 children applied for vaccination against poliomyelitis; slightly more than half were vaccinated, the remainder were controls. No poliomyelitis developed in either group. To obtain conclusive results ten times the number would

have had to be included. Local reactions occurred in half the vaccinated children, general reactions in 3 per cent.

GILLIAM, A. G., and ONSTOTT, R. H. Results of Field Studies with the Brodie Poliomyelitis Vaccine. Pub. Health Rep. 51, 7:160 (Feb. 14), 1936.

Tackling Parents' Problems at Close Quarters — Opportunities for the psychologist as a consultant for the visiting nursing service are set forth. This paper has the especial virtue of becoming modesty in presenting the claims of this specialty.

KETTERLINUS, E. The Rôle of the Psychologist in a Public Health Nursing Program. Pub. Health Nurs. 28, 2:85 (Feb.), 1936.

Experimental Poliomyelitis—Experiments are reported indicating that in monkeys poliomyelitis infection does not take place through the intestine. This does not support the epidemiologic inference which implicates water and milk as an occasional vector of the disease.

LENNETTE, E. H., and HUDSON, N. P. Failure to Infect Monkeys with Poliomyelitis Virus through Isolated Intestinal Loops. J. Infect. Dis. 58, 1:10 (Jan.-Feb.), 1936.

Tenants for Public Housing Projects—The manager of First Houses, built by the New York City Housing Authority to replace a row of ancient East Side tenements, tells how the first tenants were chosen from the waiting lists, and how they have responded to the responsibilities placed upon them for maintenance of living standards and care of equipment.

LUMSDEN, M. First Families. Survey Graphic. 25, 2:103 (Feb.), 1936.

Fear and Childbearing—Does discussion of maternal mortality terrify childbearing women, hence becoming itself a cause of increased mortality? This question is answered in the affirmative, with the further observation that it may also affect the developing baby and be a cause of neonatal mortality. As might be expected, the discussion is philosophical and not supported by research.

NEWSHOLME, H. P. An Aspect of Maternal and Infant Ill-Health. Pub. Health. 49, 5:174 (Feb.), 1936.

Education and Appendicitis—As in other studies this Cincinnati summary indicates the health educational opportunities in appendicitis. Delay and the taking of purgatives are largely responsible for the deaths. Adolescents and young adults are the most susceptible, and males outnumber females 2 to 1.

REED, M. R., *et al.* A Statistical Study of 2,921 Cases of Appendicitis. J.A.M.A. 106, 9:665 (Feb. 29), 1936.

About Clinic Economics—Two years ago objections to unfair competition of Dayton, Ohio, clinics with private practice resulted in the closing of all clinics. Medical care for the indigent was provided by government supported services supplied through private physicians on a fee basis or by city doctors on salary. When relief funds grew scarce certain clinic services were resumed at a decreased cost to the public.

Ross, M. Why Not Do Without Clinics? Survey Graphic. 25, 2:81 (Feb.), 1936.

A Head for Mental Hygiene—The need of, and opportunity for, a federal, official head for the mental hygiene program, some day to be an acknowledged part of public health administration. Important.

TREADWAY, W. L. The Place of Mental Hygiene in a Federal Health Program. Pub. Health Rep. 51, 3:181 (Feb. 21), 1936.

About Inspecting Canned Goods—A practical discussion of food inspection by a British official who compliments the American canners.

WHITE, C. F. The Inspection of Canned Foods. Pub. Health. 49, 5:180 (Feb.), 1936.

ASSOCIATION NEWS

AMERICAN PUBLIC HEALTH ASSOCIATION
SIXTY-FIFTH ANNUAL MEETING
NEW ORLEANS, LA.
OCTOBER 20–23, 1936

Please note that the dates of the 65th Annual Meeting at New Orleans previously announced as October 19–22 have been changed to October 20–23.

Instead of opening Monday and closing Thursday as ordinarily, the meeting this year will open Tuesday and run through Friday afternoon.

THE HEALTH CONSERVATION CONTESTS

THE City and Rural Health Conservation Contests for 1935 are now in the final stage. This is the 7th year of the city contest inaugurated in coöperation with the U. S. Chamber of Commerce in 1929, and the 2nd of the rural contests for full-time areas. As in other years, the urban contests are made possible through the aid of leading insurance companies, and the rural contests through the help of the W. K. Kellogg Foundation, Battle Creek, Mich.

Entries in the city competition this year number 234, representing cities in all but 3 states, and in the rural contest, 159 counties and districts are participating. The total population of the cities entered in the urban contest is more than 23,000,000, and of the rural contest a population of 6,000,000 is included. As in previous years, the city contest is divided into cities with varying population groups, while the rural contest is divided into geographic areas.

The Awards Committee this year is comprised of W. S. Rankin, M.D., of the Duke Endowment, *Chairman;* W. F. Walker, Dr.P.H., New York, N. Y.; A. J. Chesley, M.D., St. Paul, Minn.; Prof. C.-E. A. Winslow, New Haven, Conn.; T. F. Cuneen, Insurance Department, U. S. Chamber of Commerce; Henry D. Chadwick, M.D., Boston, Mass.; and George B. Darling, Dr.P.H., Battle Creek, Mich. This committee, among other measures, will take into account the adequacy of health facilities and their support and the quality of work done in safeguarding milk and water supplies, in disposing of sewage and in other usual health department practices.

One of the chief aims of the contest is the stimulation of interest and participation by business men through the chamber of commerce. More than 3,000 leading business men are identified with the committees set up to sponsor these contests through the chambers of commerce. The value of participation by these business men is conceded to be much greater than any competitive value there may be in the relative position of municipalities in the contest.

The grading committee will meet on April 10, and announcement will be made of the winning cities and counties about May 1.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Charles R. Blake, M.D., Box 1297, Richmond, Calif., Commissioner of Health

Thomas Burk, M.D., Columbia, La., Director, Caldwell Parish Health Unit

Austin McM. Clarke, M.D., D.P.H., Lakeville, N. B., Canada, District Medical Health Officer

H. B. Cottrell, M.D., C.P.H., Indianola, Miss., Public Health Officer

Albert J. Eller, M.D., Wilkesboro, N. C., Wilkes County Health Officer

Charles W. Folsom, M.D., Health Dept., Lafayette, Ga., Walker and Catoosa County Health Commissioner

William B. Furman, M.D., Pickens, S. C., Pickens County Health Officer

Jesse K. Grace, M.D., Danville, Ark., Yell County Health Director

Robert H. Hutcheson, M.D., C.P.H., State Dept. of Health, Nashville, Tenn., Acting Director, Local Health Service

Alstrup N. Johnson, M.D., Court House, Medford, Ore., Jackson County Health Officer

James E. Johnson, M.D., South 2nd & Rogers Ave., Fort Smith, Ark., Medical Director, Sebastian County Health Unit

Charles R. Keyser, M.D., Van Wert, O., County Health Commissioner

John M. Kimmey, M.D., M.P.H., Clanton, Ala., Chilton County Health Officer

James L. King, Clinton, S. C., Health Officer

Edwin A. Locke, M.D., 226 Main St., Williamstown, Mass., Director, Dept. of Health and Athletics, Williams College

Charles H. Love, M.D., Aberdeen, Miss., Director, Monroe County Health Dept.

Francis E. Mahla, M.D., 65 Front St., Columbus, O., Assistant State Director of Health

William R. May, M.D., Brookhaven, Miss., Director, Lincoln County Health Dept.

J. Arthur Melanson, M.B., D.P.H., City Hall, Moncton, N. B., Canada, District Medical Health Officer

Walter A. Minsch, M.D., Athens, Ala., County Health Officer

Manuel Morales y Fraile, Velazquez 26, Madrid, Spain, Medico del Servicio Antipaludico de la Direccion General de Sanidad

Morris Morgenstern, M.D., 552 Crown St., Brooklyn, N. Y., Medical Inspector, New York City Dept. of Health

L. M. Piatt, M.D., Ottawa, O., Putnam County Health Commissioner

Joseph K. Smith, M.D., 1950 Quincy Dr., Bakersfield, Calif., Kern County Health Officer

S. C. Tatum, M.D., Center, Ala., Cherokee County Health Officer

Robert W. Todd, M.D., Dr.P.H., 223 New Court Bldg., New Orleans, La., Director, Bureau of Parish Health Administration

Louis V. Waldron, M.D., 27 Radford St., Yonkers, N. Y., Commissioner of Health

G. Douglas Williams, M.D., City Hall, Monroe, La., Director, Ouachita Parish Health Unit

Mark W. Welch, M.D., 207 Washington Ave., Endicott, N. Y., Health Officer

Maurice S. Whiteside, M.D., Cullman, Ala., County Health Officer

Clara C. Wilder, R.N., Dept. of Health, Painesville, O., City Health Commissioner

Laboratory Section

Irma M. Azcona, Rapides Parish Health Unit, Alexandria, La., Medical Technologist and Assistant Director, Public Health Laboratory

H. A. Burnett, Jr., 920 Henry St., Detroit, Mich., Bacteriologist, Difco Laboratories, Inc.

Wesley C. Cox, M.D., 1431 Holly St., N.W., Washington, D. C., Laboratory Officer, Walter Reed General Hospital

Florence L. Evans, Ph.D., 316 L.S.U. Bldg., Charity Hospital, New Orleans, La., Junior Pathologist

Sylvester E. Gould, M.D., Eloise Hospital, Eloise, Mich., Pathologist

James A. Harrison, Ph.D., Biology Dept., Temple University, Philadelphia, Pa., Teaching, Research in Bacteriology

Glenn C. Holm, Iowa State College, Ames, Ia., Teaching Veterinary Hygiene

Gustave A. Matson, Ph.D., University of Montana, Missoula, Mont., Professor of Bacteriology and Public Health

Reginald Miller, 125 Worth St., New York, N. Y., Chemist in Charge, Dept. of Health

Helen Parsons, 402 N. Cleveland Ave., Canton, O., Director of Laboratory, City Health Dept.

Carl H. Waite, 119 Conti St., Mobile, Ala., Director, Mobile Branch of State Laboratories

Edward A. Watson, Animal Diseases Research Institute, Hull, P. Que., Canada, Chief Pathologist

Public Health Engineering Section

Roger E. Breard, P. O. Box 1030, Alexandria, La., Sanitarian, Rapides Parish Health Unit

Marvin F. Carter, Rm. 105 Courthouse, Memphis, Tenn., Technical Assistant to Sanitary Engineer, Dept. of Health

Russell L. Johnson, 70 Hull St., Coldwater, Mich., Sanitary Engineer, Branch County Health Dept.

Industrial Hygiene Section

Ethel W. Langenberg, R.N., 800 Empire Bldg., Milwaukee, Wis., Industrial Nursing Field Worker

Edgar Mayer, M.D., 470 Park Ave., New York, N. Y., Assistant Professor of Clinical Medicine, Cornell University Medical College

Child Hygiene Section

William L. Hughes, Ph.D., Teachers College, Columbia University, New York, N. Y., Associate Professor of Physical Education

Ralph H. Pino, M.D., 1001 David Whitney Bldg., Detroit, Mich., Medical Consultant, Sight Saving and Braille Work, Public Schools

Wallace L. Poole, M.D., M.P.H., Box 265, Jonesboro, Tenn., Director, Johnson City and Washington County Health Departments

Public Health Education Section

Morris Cramer, D.D.S., 2000 Eutaw Place, Baltimore, Md., Supervisor, Division of School Dental Clinics, City Health Dept.

Jacob E. Goldstein, M.D., 31 N. 11 St., New Hyde Park, L. I., N. Y., Health Officer and School Physician

Marjorie B. Illig, 1250 Sixth Ave., New York, N. Y., Lay Field Representative, American Society for Control of Cancer

Edward C. Podvin, M.D., 4751 Park Ave., New York, N. Y., Executive Officer, Bronx County Medical Society

Maurice G. Postley, 2842 Grand Concourse, Bronx, New York, N. Y., Secretary, Dept. of Health

Adolph J. Roth, D.P.H., Pullman, Wash., Assistant Professor of Bacteriology and Hygiene

Mildred C. Rouse, R.N., 1407 Eleanor Ave., Toledo, O., School Nurse, Board of Education

Raymond G. Upton, Nacogdoches, Tex., Teacher, Biology and Public Health, Stephen F. Austin State Teachers College

Public Health Nursing Section

Ruth J. Cramer, R.N., 4755 W. Beloit Rd., Milwaukee, Wis., Public Health Nurse, Health Dept.

Emma Danheim, R.N., 602 Lamar, Houston, Tex., Teacher of Public Health Nursing, Memorial Hospital

Llouella L. Haage, R.N., 129 Magnolia Ave., Jersey City, N. J., Supervisor of Public Health Nurses, Board of Education

Ruth E. Lutz, R.N., Visiting Nurse Association, Oshkosh, Wis.

Lucy E. Massey, School of Applied Sciences, Western Reserve University, Cleveland, O., Assistant Professor of Public Health Nursing

Pauline Tarver, R.N., Ouachita Parish Health Unit, Monroe, La., Public Health Nurse

Epidemiology Section

Charles D. Bowdoin, M.D., C.P.H., State Dept. of Health, Atlanta, Ga., Chief, Division of Epidemiology

William Grossmann, M.D., State Office Bldg., Richmond, Va., Assistant State Epidemiologist

Unaffiliated

Dr. Abdurrahman Besen, Kocaeli sitma mucadele heyeti reisi, Izmir, Turkey, Chief, Anti-Malarial Committee

Joseph E. Paulin, M.D., D.P.H., Tracadia, N. B., Canada, District Medical Health Officer

William F. Roberts, M.D., 2 Douglas Ave., St. John, N. B., Canada, Minister of Public Health

DECEASED FELLOWS AND MEMBERS

E. T. Hanley, M.D., Seattle, Wash., Elected Member 1925, Fellow 1930

Professor Royce R. Long, Stanford University, Calif., Elected Member 1919, Fellow 1923

Ida M. Alexander, M.D., Lansing, Mich., Elected Member 1929

Joseph A. Cooke, M.D., Meriden, Conn., Elected Member 1930

Albert Pfeiffer, M.D., Albany, N. Y., Elected Member 1925

Vergil Ross, M.D., Champaign, Ill., Elected Member 1930

Arthur C. Weinberger, New York, N. Y., Elected Member 1926

J. Blake White, M.D., New York, N. Y., Elected Member 1920

Francis X. Mahoney, M.D., Boston, Mass., Elected Member 1912, Fellow 1922

Archie Cole, Pampa, Tex., Elected Member 1931

W. H. Peters, M.D., Cincinnati, O., Elected Member 1913, Fellow 1927

Edgar Sydenstricker, New York, N. Y., Elected Member 1917, Fellow 1922

NEWS FROM THE FIELD

Dr. Parran Nominated Surgeon General of the U.S.P.H.S.

THOMAS Parran, Jr., M.D., has been nominated by President Roosevelt to succeed Hugh S. Cumming, M.D., as Surgeon General of the U. S. Public Health Service. He has been State Health Commissioner of New York since 1930.

Dr. Parran received his medical degree in 1915 from the Medical School of Georgetown University in Washington, D. C.

Thomas Parran, Jr., M.D.

Following his graduation, Dr. Parran served as resident physician at Sibley Memorial Hospital in Washington and later accepted a temporary appointment in the U. S. Public Health Service in connection with field investigations of rural sanitation in Greenville County, S. C., Obion County, Tenn., and Clay County, Mo. He entered the commissioned corps of the Service in March, 1917, since which time he has had a variety of assignments.

In 1926, he represented the United States at an interchange of public health officers held in Denmark. In 1925 he visited Europe for the purpose of studying methods of control of the venereal diseases. During the latter part of 1926, he was assigned as Assistant Surgeon General in Charge of the Division of Venereal Diseases of the Public Health Service. Early in 1930, Governor Roosevelt of the State of New York requested the loan of Dr. Parran to act as State Health Commissioner for New York. He has served in that capacity since that time.

For 10 years Dr. Parran has been chairman of a coöperative clinical group organized for the purpose of studying methods of treatment and control of syphilis. This group consists of the clinicians in charge of 5 large venereal disease clinics in some of the leading hospitals of the United States. He has been actively identified in an advisory capacity with a number of the volunteer health organizations such as the American Society for the Control of Cancer and the American Social Hygiene Association.

In July, 1935, Dr. Parran was appointed a member of the Scientific Advisory Board of the National Research Council. He was also appointed a member of the Advisory Council of the Henry Phipps Institute of Philadelphia in October, 1935, succeeding Dr. William H. Welch, deceased, of Baltimore. He was Chairman of the American delegation attending the International Congress on Dermatology and Syphilis which was held in Budapest in the fall of 1935.

He is a member of the Albany County Medical Society, the New York State Medical Association, the New York Academy of Medicine, and the American Medical Association. He is the author of a number of papers dealing with public health and scientific subjects.

Dr. Parran if appointed will be the sixth Surgeon General of the U. S. Public Health Service. He will be the first Surgeon General of the Public Health Service who has served as state health officer prior to becoming Surgeon General. Previous to assuming his duties as State Commissioner of Health in New York, his experience in state health work was extensive.

Dr. Parran was Treasurer of the American Public Health Association from 1931 to 1933, and Chairman of the Executive Board from 1933 till the Annual Meeting in Milwaukee in October, 1935, when he became President-Elect. He will assume the office of President at the Sixty-fifth Annual Meeting in New Orleans in October of this year. He has been a member of the Association since 1919, and a Fellow since 1923.

DEATH OF DR. NICOLLE

DR. Charles Jean Henri Nicolle died in Tunis on February 28. Born in Rouen, France, September 21, 1886, he was known and honored throughout the world for his contributions to public health and particularly for his discovery in 1909 of the louse transmission of typhus fever. Then, "for the first time in all the centuries of a one-sided warfare, with man forever in the open and typhus ever in ambush, the victim was in a position to organize a rationally planned and strategically sound defense against his historic enemy." *

* Zinsser, Hans. *Rats, Lice and History*, 1935, p. 295.

At the time of his death Dr. Nicolle was director of the Pasteur Institute branch in Tunis, which city he is said to have made one of the healthiest in Northern Africa. His work on typhus fever began there in 1906 when the city experienced a serious epidemic.

Working first with chimpanzees and later with apes, he demonstrated that the typhus virus existed in the blood of patients and that convalescent serum conferred immediate though temporary immunization. His studies made possible the epidemic control of the disease through sanitary measures designed to destroy the route of infection through the body louse. It has been stated that if such control had not been possible the World War would have been brought to a standstill by one vast typhus epidemic affecting all European fronts.

Dr. Nicolle also made notable contributions to the treatment and prevention of yellow fever, undulant fever, Malta fever, measles, and other diseases. In 1928 he was awarded the Nobel Prize in Medicine.

In addition to his scientific eminence he was known as a graceful and entertaining writer. In awarding him the Carthago Medical Prize in 1922 it was noted that he was equally eligible for that fund's literary prize.

In his passing, the world loses another hero of the Pasteur tradition.

MASSACHUSETTS ASSOCIATION CHANGES NAME

THE Massachusetts Association of Boards of Health held its annual meeting in Boston on January 30, and decided at that time to change the name of the Association to "The Massachusetts Public Health Association." The large meeting, including gatherings of the three sections, was addressed by Prof. C.-E. A. Winslow, of Yale University, on "Opportunities and Possibilities in Public Health."

New Officers of the Association are:

President: Paul R. Withington, M.D., Milton
First Vice-President: Ernest M. Morris, M.D., Fall River
Second Vice-President: Prof. Curtis M. Hilliard, Wellesley
Secretary-Treasurer: G. Donald Buckner, Needham

Other members of the Executive Committee are:

Henry D. Chadwick, M.D., Boston
William O. Hewitt, M.D., Attleboro
Charles F. Wilinsky, M.D., Boston
Harold D. Chope, M.D., M.P.H., Newton
L. Jackson Smith, M.D., Springfield

Representatives of the sections are:

John J. McGrath, of Salem, Board of Health Section
Edwin H. Place, M.D., Boston, Laboratory Section
Raymond S. Patterson, Ph.D., Newton, Child Hygiene and Public Health Nursing Section

SOUTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION

AT its Annual Meeting on February 22, 1936, the Southern California Public Health Association elected the following officers:

President: Dr. Raymond V. Stone, Los Angeles
President-Elect: K. H. Sutherland, M.D., Santa Ana
First Vice-President: W. L. Halverson, M.D., Pasadena
Second Vice-President: F. D. Sweger, Los Angeles
Secretary-Treasurer: Charles W. Arthur, Pasadena

UNIVERSITY OF CINCINNATI DEPARTMENT REORGANIZED

THE Department of Preventive Medicine at the University of Cincinnati has been organized from the former sub-department of Bacteriology. Thomas J. LeBlanc, Sc.D., C.P.H., and W. E. Brown, M.D., are in charge.

INTERNATIONAL NURSING REVIEW

PUBLICATION of the *International Nursing Review* has been resumed, after the lapse of a year. The management of the *Review* has been entirely reorganized.

It is to appear as a quarterly magazine, and will be published at the headquarters of the International Council of Nurses, 14 Quai Gustave Ador, Geneva—to which address subscriptions (Swiss francs 8 per annum) should be sent.

PERSONALS

HELEN M. HOWELL, R.N., has been appointed to the staff of the West Virginia State Health Department as Director of Nursing Education, a service being developed under provisions of the U. S. Public Health Service. The educational program as planned under the Virginia State Health Department will include institutes, group conferences, individual instruction for the public health nurses already employed, and the establishment of a training center for nurses entering the service.

HULDA A. B. CRON, R.N., Director of the Public Health Nursing Association, Evansville, Ind., member A.P.H.A., is taking a year's leave of absence to study public health at Teachers College, Columbia University, New York.

JOHN L. JONES, M.D., of Cleveland, O., member A.P.H.A., has been appointed Health Officer of Medina County, O., to succeed Dr. Thomas W. Mahoney.

DR. CHESTER A. BENNETT, of Strasburg, O., has succeeded Joseph Blickensderfer, M.D., of New Philadelphia, O., F.A.P.H.A., as Health Officer of Tuscarawas County.

HARRY K. GIDLEY, formerly connected with the Kellogg Foundation of Michigan, has been placed in charge

of the West Virginia WPA rural sanitation program, succeeding Fred T. Foard, M.D., F.A.P.H.A., who was recently transferred by the U. S. Public Health Service from Charleston to San Francisco, where he is Regional Consultant for the Service in a territory embracing 9 states.

LINWOOD FARLEY, M.D., member A.P.H.A., has been appointed Health Officer of Hanover County, Va., with headquarters at Ashland.

DR. WILLIAM B. KEELER, recently appointed Health Commissioner of Boston, Mass., to succeed the late Francis X. Mahoney, M.D., Fellow A.P.H.A., was the guest of honor at a dinner held in Boston in January and attended by 428 persons. Dr. Keeler has been connected with the Health Department staff for some years. Charles F. Wilinsky, M.D., F.A.P.H.A., who acted as host and toastmaster, will continue as Deputy Commissioner of Health.

DR. WILLIAM T. HARPER, of Fayette, Miss., has been appointed Director of the part-time health unit in Jefferson County.

DR. THOMAS W. MAHONEY, of Medina, O., Health Officer of Medina County, has been appointed Health Officer of Lucas County, with headquarters in Toledo, O., succeeding Dr. Milton R. Kukuk.

DR. CHARLES F. THOMPSON has been appointed Health Officer of Noble County, O., to succeed Dr. George M. Mason.

DR. HARRY G. SOUTHARD, of Marysville, O., formerly State Health Director, has been appointed Health Officer of Noble County, to succeed Dr. John D. Boylan, of Milford Center.

DR. J. WILL PAYNE, of Willow Wood, O., has succeeded Dr. Forrest R. Stewart, of Ironton, as Health Officer in Lawrence County, O.

DR. ROBERT E. HARPER, for 10 years Health Officer of Lawrence County, Ala., has resigned to accept a similar position in Colbert County, with headquarters at Tuscumbia.

DR. PAUL M. THOMPSON, formerly of Spartanburg, S. C., has been appointed Health Officer of the recently created health unit in Henry County.

DR. WILL R. WILLIAMS, of Richlands, Va., was appointed recently to the State Board of Health, to succeed the late Dr. Joseph A. McGuire, of Norton.

DR. QUINTUS H. BARNEY has been elected Health Officer of Altavista, Va., and community, succeeding the late Dr. John Arnold Board.

DR. JOHN W. BOWDOIN, of Bloxom, Va., was recently appointed Superintendent of Public Welfare for Accomac County.

DEATHS

EDGAR SYDENSTRICKER, F.A.P.H.A., Director of Scientific Research, Milbank Memorial Fund, New York, N. Y., and formerly Statistician for the U. S. Public Health Service and Consultant to the Health Committee of the League of Nations, died in New York on March 19.

DR. CHARLES HARVEY ARCHIBALD, retired roentgenologist, of Asbury Park, N. J., died February 28, as a result of burns suffered in his X-ray work years ago. He was 71 years old.

DR. JOHN H. MOUNTAIN, member A.P.H.A., Health Officer of Middletown, Conn., and formerly State Senator, died March 7, at the age of 66.

DR. WILLIAM H. PETERS, for more than 15 years Health Commissioner of Cincinnati, Ohio, formerly a F.A.P.H.A., died March 13, at the age of 54.

CONFERENCES AND DATES

Apr. 1–3, Canadian Section of the American Water Works Association, Hotel Royal Connaught, Hamilton, Ont.

Apr. 8, Annual Meeting of the Massachusetts Tuberculosis League, Hotel Kimball, Springfield, Mass.

Apr. 9–10, American Association of Pathologists and Bacteriologists, Boston, Mass.

Apr. 9–11, American Association of Anatomists, Durham, N. C.

Apr. 14, 15, Central Atlantic States Association of Dairy, Food and Drug Officials, Warwick Hotel, Philadelphia, Pa.

Apr. 15–18, American Physical Education Association Convention, Hotel Statler, St. Louis, Mo.

Apr. 22–25, National Tuberculosis Association, New Orleans, La. Meeting Headquarters, Municipal Auditorium; Residence Headquarters, Hotel Roosevelt.

Apr. 25–May 2, National Boys' and Girls' Week.

Apr. 28–May 2, 43rd Annual Convention of the Association for Childhood Education, Hotel Pennsylvania, New York.

May, 1936, Food Industries Exposition, Oakland, Calif.

May 1–4, 60th Annual Meeting of the American Association on Mental Deficiency, Hotel Jefferson, St. Louis, Mo.

May 3–6, International Society for Crippled Children, St. Louis, Mo.

May 10, Mother's Day.

May 11–15, American Medical Association Convention, Kansas City, Mo.

May 11–15, 40th Annual Convention—National Congress of Parents and Teachers, Hotel Schroeder, Milwaukee, Wis.

May 14–16, American Water Works Association—Pacific Northwest Section, Aberdeen, Wash.

May 24–30, National Conference of Social Work, Ambassador Hotel, Atlantic City, N. J.

May 24–30, American Association of Hospital Social Workers, Atlantic City, N. J.

June 6–Nov. 29, Medical Exhibit, "Story of Life," in Texas Centennial Exposition, Dallas, Tex.

June 8–12, Annual Convention of American Water Works Association, Hotel Biltmore, Los Angeles, Calif.

June 10, Spring Meeting of the New York State Sewage Works Association, Lido Beach, L. I., N. Y.

June 20–26, Canadian Medical Association, Victoria, B. C.

June 21–26, Biennial Convention of the American Nurses' Association, the National League of Nursing Education, and the National Organization for Public Health Nursing, Los Angeles, Calif. Headquarters will be, respectively: A.N.A., and N.L.N.E., Ambassador Hotel; N.O.P.H.N., Biltmore Hotel.

June 22–25, Annual Meeting of the National Association of Master Plumbers, Hotel Statler, Buffalo, N. Y.

June 24–27, Seventh Annual Meeting, Western Branch, A.P.H.A.—meeting simultaneously with Canadian Public Health Association—Vancouver and Victoria, B. C.

June 27–July 2, National Education Association, Portland, Ore.

July 6–10, 29th Annual Meeting of the American Home Economics Association, Olympic Hotel, Seattle, Wash.

July 6–11, The Royal Sanitary Institute, Southport, England.

July 13–17, American Dental Association, San Francisco, Calif.

Oct. 20–23, Sixty-fifth Annual Meeting of the American Public Health Association, New Orleans, La. Meetings Headquarters, Municipal Auditorium; Residence Headquarters, Hotel Roosevelt.

Positions Wanted

HEALTH OFFICERS

Physician, M.D., Rush Medical College, post-graduate work, University of Paris; 5 years' experience as county health officer and 7 years as city health officer; desires administrative position, large city. Available now. A-215

Young man, C.P.H., M.I.T.; 3 years' experience as sanitary inspector in various health units; desires position as health officer. A-216

Young man, A.B. and post-graduate work in public health, University of Mich.; now employed as supervisor of health survey desires position as health officer. A-217

LABORATORY

Technician, young man, graduate Brooklyn College; extensive experience in laboratory medicine, blood chemistry, bacteriology; several publications in serology; former research worker in Grade A medical school; desires position as medical technician or research worker. L-218

Physician, M.D., Rush Medical College; Ph.D. in Bacteriology, University of Chicago; several years' experience as Professor of Bacteriology in various universities and as bacteriologist and medical director of a commercial concern; desires position as bacteriologist, medical director, or research director. Excellent references. L-219

Man, V.M.D., M.D. in Bacteriology and Ph.D. in Immunology and Pathology, Ohio State University; 10 years' experience in laboratory work; desires position as laboratory director in the South or West. L-220

Young man, M.S. in Bacteriology, University of Maryland; considerable experience in various laboratory positions; desires a teaching position or a position in an institution with an opportunity to do research work. L-221

Young woman, graduate of University of Kansas; experience as director of out-patient department laboratory of University Hospital; desires position as laboratory technician. L-222

NURSES

Qualified and experienced tuberculosis and public health nurse, including school work, organizing and supervising clinics, follow up work; desires position. N-223

Public health nurse, experienced both in institutional nursing and county health work; desires a position as public health nursing supervisor. N-224

MISCELLANEOUS

Physician, M.D. Harvard Medical, C.P.H. Harvard-Technology School for Health Officers; experience as a city and county health officer and as director of the Division of Communicable Diseases in a State Department of Health; desires position as school or college physician or work in vital statistics. A-225

Man, D.D.S. and Ph.D. University of Michigan; author of many articles on public health education; considerable experience as lecturer and editor of publications; desires position as Director, Public Health Education. A-226

Positions Available

Persons with medical and post-graduate education who are seeking employment are invited to communicate with the Executive Secretary in regard to several available opportunities.

ANNOUNCEMENT OF EXAMINATION FOR APPOINTMENT AS ASSISTANT SURGEON (MEDICAL ONLY) IN THE REGULAR CORPS OF THE U. S. PUBLIC HEALTH SERVICE

An examination for entrance into the Regular Corps of the U. S. Public Health Service in the grade of Assistant Surgeon (medical only) is hereby announced to be held April 13, 1936. Applicants must not have passed their thirty-second birthday. They must be graduates of a reputable medical college and have completed at least one year of interneship since graduation, or its equivalent.

Compensation: $3,158 per annum with dependents and $2,699 per annum without dependents.

Persons desiring permission to take this examination should make request to the Surgeon-General, U. S. Public Health Service, Washington, D. C., for the necessary blanks and other information.

MASSACHUSETTS CIVIL SERVICE EXAMINATION

TUBERCULOSIS FIELD NURSE

Last date for filing applications, April 11, 1936, at 12:00 Noon.

Salary: Minimum—$1,560; Maximum—$2,040.

Duties: Under supervision, to perform work in tuberculosis control; to work on the Chadwick Clinics; to perform related work as required.

Entrance Requirements: Applicants must be registered nurses under the State Division of Registration of Nurses. Applicants must have at least one year's experience in public health nursing. Applicants must possess a motor vehicle operator's license.

For further information and application blanks communicate with the Division of Civil Service, Rooms 145-152, State House, Boston, Mass.

Where no other address is given excepting the key number, address your replies to the American Journal of Public Health, 50 West 50th Street, New York City, indicating clearly the key number on the envelope. Your replies will then be forwarded.

American Journal of

Public Health

And The Nation's Health

Volume 26 May, 1936 *Number 5*

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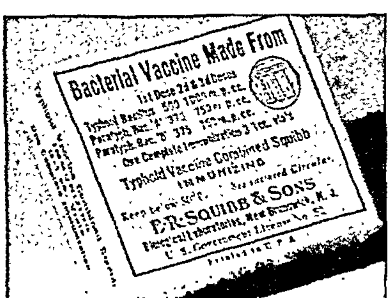

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American Journal of Public Health

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Official Monthly Publication of the American Public Health Association

Volume 26 — May, 1936 — Number 5

CONTENTS

Continued on page vi

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Readers' Guide in your library.

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Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 50 West 50th Street, New York, N. Y.

Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932.

Continued on page viii

Reprint prices furnished upon request

New report shows

BRAN HELPS MAINTAIN IRON SUPPLY

of the human body

A RECENT scientific study has added important new facts to our knowledge of bran. The November, 1935, issue of the *Journal of the American Dietetic Association* reports a comparative study of bran and egg-yolk, a known rich source of iron.

The subjects were healthy young women. The conclusions developed by the experiment were *"that the iron of egg-yolk and of bran can be used with equal efficiency for the maintenance of iron equilibrium in the human adult."*

This study continues a series of researches, conducted over a period of five years, in which new contributions to our information on bran have been made. Some of these tests have confirmed the value of bran as a safe laxative food for normal people. Others have demonstrated that it does not lose its effectiveness with continued use.

Further independent tests on men have indicated that the "bulk" in bran is often more effective than that found in fruits and vegetables.

Laboratory studies have shown that Kellogg's ALL-BRAN supplies generous "bulk," which absorbs moisture and gently sponges out the intestinal tract. This delicious cereal corrects constipation due to insufficient "bulk." It is usually more satisfactory for this purpose than the continued use of medicines.

ALL-BRAN may be served as a cereal, with milk or cream, or cooked into muffins, breads, etc. It has a delicious nut-sweet flavor. Sold by all grocers. Made by Kellogg in Battle Creek.

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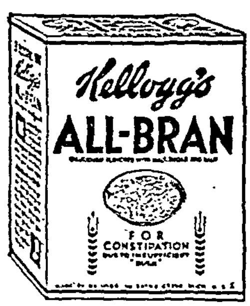

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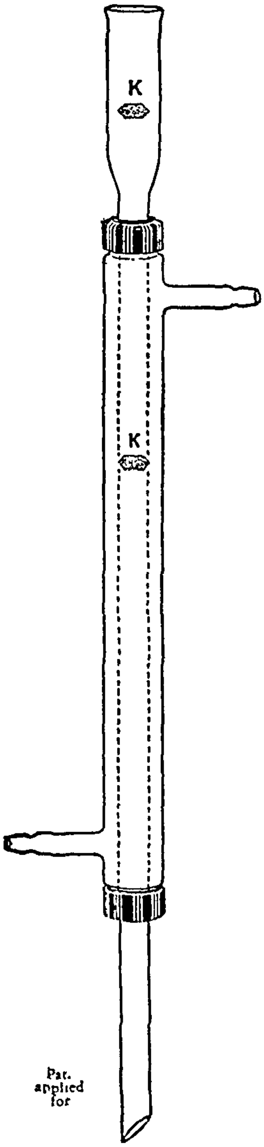

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250	450	36	250	36	450	48
300	500	36	300	36	500	48
400	600	36	400	36	600	48
500	700	36	500	36	700	48
600	800	24	600	24	800	36
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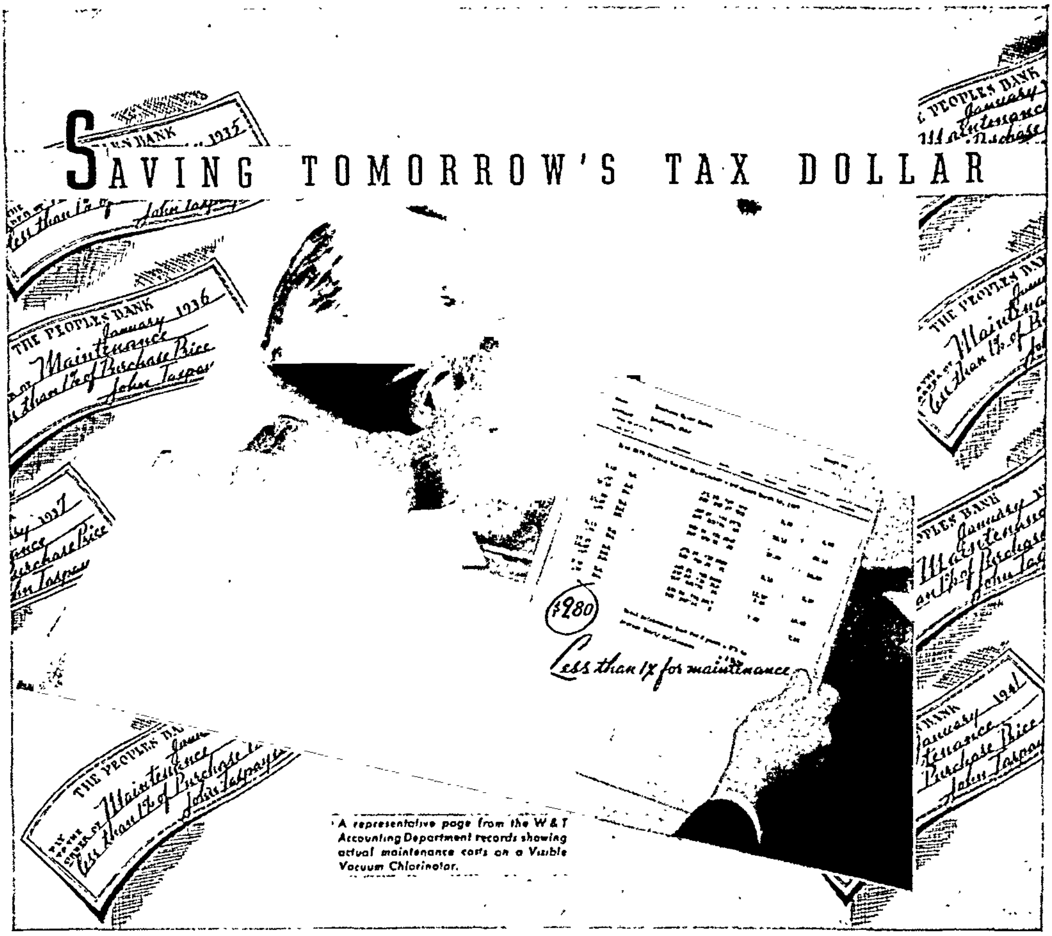
Society	*Secretary*	*Place and Time of Annual Meeting*
Connecticut Public Health Assn.	Ira V. Hiscock	Hartford, May, 1936
Florida Public Health Association	S. G. Thompson, D.P.H.	To be announced
Georgia Public Health Association	M. E. Winchester, M.D.	To be announced
Massachusetts Public Health Assn.	G. Donald Buckner, S.B.	Boston, January 28, 1937
Michigan Public Health Association	Marjorie Delavan	Lansing, November, 1936
Missouri Public Health Association	Dr. C. F. Adams	Columbia, Mo., September, 1936
New Mexico Public Health Assn.	Paul S. Fox	Carlsbad, May 6–8, 1936
Northern California Public Health Association	Dr. I. O. Church	To be announced
Ohio Federation of Public Health Officials	W. D. Bishop, M.D.	Columbus, November, 1936
Pennsylvania Public Health Assn.	J. Clarence Funk	May 19–21, 1936
South Carolina Public Health Assn.	Laura Blackburn	To be announced
Southern California Public Health Association	Charles W. Arthur	To be announced
Texas Public Health Association	Lewis Bracy	Kilgore, October, 1936
Virginia Public Health Association	B. B. Bagby, M.D., Pres.	To be announced
West Virginia Public Health Assn.	John Thames, M.D.	October, 1936
Southern Branch, American Public Health Association	G. Foard McGinnes, M.D.	To be announced
Western Branch, American Public Health Association (joint meeting with Canadian Public Health Association)	William P. Shepard, M.D.	Vancouver and Victoria, B. C., June 24–27, 1936



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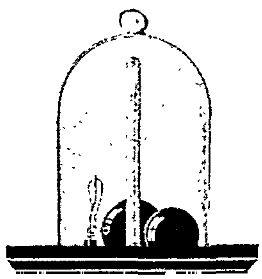

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and THE NATION'S HEALTH

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Child Health and the Elementary School*

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THE average child presents himself for admission to the elementary school under the coercion of the state or provincial authorities at between 5 and 6 years of age. He comes from a home in which consideration for personal health is largely confined to the treatment of manifest evidence of illness, and a casual concern with the major forms of communicable disease. The treatment program is usually a combination of self-medication with patent medicines or home remedies, and orthodox medical care; the preventive program is largely confined to an avoidance of the so-called hardships of quarantine. His health practices are based on racial custom and economic conditions.

The physical condition of this child is subject to the influence of a number of variables, among which are the financial or social position and the health concern of his parents. It is an even break that he is already handicapped with one or more of the half dozen commoner defects. He has probably received the minimum of medical supervision since the period of infancy. His physical activities have been largely confined to doing the things which were either frowned upon or received only a grudging parental approval, on the street, in the backyard, or neighboring vacant lot. He may or he may not know how to play; he has a minimum of interest in work or sustained effort. His mental health has been favorably or adversely influenced by the emotional or intellectual status of his forebears and the attitude of his parents toward life and its problems. Approximately 2,500,000 such children, well- or ill-equipped physically, are thrust through the school doors for the first time, each year in Canada and the United States.

What can we say about him at graduation? In centers in which consideration for the health needs of children have been ignored, we find that the average child upon graduation has acquired certain health habits, some good, some bad. He has an inadequate amount of sound knowledge in support of the good habits, and less that is condemnatory of the bad. He is un-

* Read at a Joint Session of the American Association of School Physicians and the Child Hygiene Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

duly influenced by dogmas, either those of his race, his parents, or his teacher. To him, newer health knowledge is merely a matter of supplanting old dogmas with new ones.

His dietary habits are largely the result of the ignorance or knowledge of his parents. Unrestrained, he eats what he likes best, in whatever quantities he can get. He sleeps less than he should. He rests not at all. His exercise is acquired as part of his play or work. His habits, in terms of mouth hygiene, are dictated by the interest of the teacher and the enthusiasm of the parents.

Much, if not most of his interest in cleanliness is the result of his environment. (The fact that the majority of the schools in the Province of Ontario make no serious provision for hand washing does little to direct such interest.)

He has vague ideas how communicable diseases are spread, and is more impressed by hardships associated with the measures directed at their control, than the reasons for the existence of such control measures. His physical condition is probably no better than it was at the time of his school entrance.

These comments may seem to some to be non-pertinent or exaggerated; they are, however, based on an interest in the subject of longer standing than I care, at the moment, to admit. Irrespective of their pertinence, and making allowance for the possibility of a more than warranted somber tinging of the picture, the fact remains that nearly one-fifth of our national population is so placed that it can be readily affected by any well considered scheme for health betterment.

The school is an institution operated by the municipality or state and designed best to equip all of those who are considered educable to meet the manifold problems that confront man in his search for social development and spiritual contentment. Granted a whole-hearted acceptance of such a definition of the school's responsibility, then we would be at liberty to proceed with the consideration of how such a program as we have in mind might best be implemented. There are, however, still many who are convinced only of the pedagogical responsibility of the school; while others who grudgingly subscribe to the definition in principle, are rather perfunctory as to its practice. Personally, I am convinced that the major responsibility of the state today is to make adequate provision for an educational program designed to meet not only the intellectual but the social, physical, and emotional needs of this age group.

Appreciative of your interest, I presume to present my conception of such a program as it affects the health of the school age child. The problem has many facets; its solution implies: a state and municipality conscious of its obligations, an appropriate plant, an informed teacher, a concerned parent, an impressionable pupil, supplemented by an appropriate group of auxiliaries. Let us discuss each of these briefly:

State and provincial health authorities have been conscious for some time of the importance of a constructive program adapted to the health needs of children. In the majority of instances, they have exerted all their influence in favor of a well rounded scheme designed best to meet the exigency of the situation as they saw it. In some cases, however, they have unduly emphasized one aspect of the problem and exaggerated the merits of the suggested corrective agency, while others may not have given this matter all the consideration its importance would warrant. Educational leaders, naturally conservative in their viewpoint, have in the past too often either made restrained gestures of friendliness to the advocates of change or viewed

with concern their visionary doctrines. However, there is every evidence that both health and educational authorities are today prepared to give fitting consideration to any well thought out practicable scheme of school health supervision.

What of the school plant? When an official interest in the health of the school age child was first manifested, much was expected in the way of improvement in the school plant as such. That the hopes of the early proponents of such a program have not been realized is due to a diversity of reasons:

First, the dependence of the elected school authorities on the opinion of architects and building contractors and the failure on the part of these to appreciate fully the importance of what is literally implied by maximum hygienic accommodation; second, the lack of well established leadership in this field by the school health staff; and, lastly, by the fact that the direct relationship between indifferent school hygiene and unsatisfactory health is often difficult to demonstrate.

However, the first evidence of an interest in the physical well-being of the school population by the accepted authorities is a desirable type of school building, adequately equipped to safeguard the health of its occupants. The question as to what is implied by this rather casual observation is not easy to answer. Unfortunately, the average school physician is content to accept as fact the presumptions of individuals who are either long since deceased or those who will directly or indirectly profit financially by the acceptance of the opinion expressed.

The first step in the correction of such an undesirable state of affairs is the establishment of accepted standards based on scientific inquiry. Whether each child actually needs a fixed number of cubic feet of air space, and what that number should be; whether cross-lighting is a more serious defect than insufficient lighting; whether the commonly used type of school desk and seat contributes adversely to the present or future ill health of the pupil; and how imperative is the sustained maintenance of a fixed degree of air moisture; are all questions constantly confronting the school medical officer.

While some of the questions of this type may be readily answered, others present apparent difficulty in the way of solution. Until we are in a position to refute specifically the specious arguments and to overcome, by statements scientifically sound and universally accepted, the evident disinterest of those responsible for school construction and maintenance, little can be expected by way of improvement. I urge that consideration be given to the setting up of such standards.

Presuming that the school plant is at least innocuous, we suggest that the teacher is the next significant factor in the establishing of our program. I do not mean next in terms of importance but next in sequence. Actually, I am inclined to resort to superlatives in discussing the place of the teacher in the scheme suggested. Significant might be supplanted by paramount, for without the interest of the teacher, any serious modification of the existing program savors of futility. With such interest raised to enthusiasm, all things are possible.

May I interject here that my comments are based on my experience in that part of Canada with which my official responsibilities compel familiarity. (I am not speaking of tomorrow —because radical changes are proposed.) The average teacher in the elementary school today spent 4 or 5 years in high school—all too often only 4; she came largely from the rural or small urban type of community; her

background was limited, her interest in health matters negligible, her health knowledge equally inadequate. At no time during her preliminary education was a sufficiently serious attempt made to focus attention on the importance of personal or community hygiene. During the period of attendance at the teacher-training school, whatever instruction was given in the subject was largely of an academic character. The instructor was compelled to spend most of the available time bolstering up the student's limited knowledge of the simple principles of physiology, anatomy, bacteriology, and epidemiology. School hygiene is still considered a rather insignificant subdivision of school management, and presumably receives the instructional emphasis that the space devoted to it in the manual would indicate. This is the inadequately seasoned timber which, until today, has been largely available for the building of the essential framework for your school health program.

What of the curriculum? To date, the only provision made is a fixed period of from 20 to 30 minutes, 1 day a week, for all children in the 6th, 7th, and 8th grades, during which the teacher attempts to interpret the contents of the pupil's text. Neither teacher's manual nor reference text has been available for guidance. However, there is every evidence of change and we await with patience the report of those at present engaged in many centers in curriculum building. How can this change be expedited? If the present attitude of the educational authorities in Ontario can be taken as an index of state and provincial interest, then all that is necessary is to avoid a further deferment of hope by a politic presentation of a practicable program; but it is my feeling that in lagging places, the incentive to action must come from those who are professionally concerned with the health of children.

May I be permitted to review the plan which is already in effect in the Province of Ontario? The academic requirements of present and future teachers have been very definitely raised to include the equivalent of the first 2 years of Pass Arts, plus credit courses to be taken in such subjects as—music, art, agriculture, physical education, auxiliary class management, and health teaching. The course in hygiene in the normal training school is supplemented by lectures and demonstrations given by members of the staff of the Provincial Department of Health. The instructors giving such a course are selected on the score of special qualifications for the post. All students are required to pass a thorough medical examination, conducted by carefully selected groups of physicians, the student paying a substantial part of the examination fee. All students showing a positive intracutaneous tuberculin test receive an X-ray examination of the chest, and all those presenting any appreciable deviation from the physical normal are reviewed by a special medical board prior to admission. A teacher's handbook is at present awaiting final approval, a teacher's reference text is in the process of preparation. The question of suitable supplementary readers and pupil's texts is in the hands of the interdepartmental committee on health teaching. The question of adding hygiene to the curriculum of the secondary schools and making it a requirement for those seeking entrance to the teaching profession likewise awaits decision by the same committee. The credit course in health teaching referred to, is a 5 weeks' summer course. After 2 years' experiment, it received this year the stamp of departmental approval. Further, the Provincial Department of Health assists teachers in securing approved health teaching aids and directional material.

There are gaps in the scheme, but they will be filled and we have every hope that in a reasonable time we will have in Ontario a large body of teachers conscious of their responsibility in this field and reasonably well equipped to assume it.

We previously referred to certain auxiliary agencies who had an implied place in any well considered school health program. The physician, the nurse, the dentist, the mental hygienist, and the physical instructor—what rôle are they expected to assume? Consideration of the activities of the school physician and school nurse may be considered jointly in view of the intimacy of their official relationships. They are teamed for a common purpose, namely, the protection of the present and future health of the pupil. They have approached their task through certain well trod avenues; I fear that in some cases, the footsteps of the pioneers have been so assiduously followed that the paths have become ruts.

Control of contagion, detection and correction of physical defects, supervision of school sanitation, and health instruction are hackneyed terms to the introspective administrator in this field; yet consideration must be given to the respective importance of these various components of an acceptable type of service, for example, the control of communicable forms of illness is an essential requisite to an effective child health program. The objective is sound, the method of approach only is in need of review. School nurses continue to devote 30 per cent of their available time to routine classroom inspections, automatically looking for communicable diseases they rarely find, and hours are wasted weekly in the examination of children seeking readmission to the school after unexplained absence, who have already spent half a day or even more in the classroom to which they are hoping to be readmitted. In the event of an epidemic, one finds equal concern being manifested in those who are found, on careful inquiry, to have already had the disease in question, and those who are non-immune. An active instructional program directed at parent, teacher and pupil and dealing with the recognition of the early and prodromal symptoms of the commoner forms of contagious disease, the value of isolation and the merits of the known immunizing agents is worth years of casual inspection.

The school medical officer spends hours in the monotonous task of examining well children, presumably hoping that he may uncover some potential defect at a stage when a medical Demosthenes could not convince the parent or guardian of the significance of his findings. The records are loaded with reported cases of tonsillar abnormality, malnutrition, and postural defect, which are undiscoverable on second examination. The school physician when employed, and I am not perturbed at the moment by the question as to the ethics of his employment, should be primarily concerned with those children who are physically below par, and he should exercise the same interest and ingenuity in securing the correction of the condition present as he does in the care of the sick who seek his help in home or hospital. The school medical officer has a distinct contribution to make, but too much of his time is often devoted to the perfunctory performance of intangible tasks.

What of the dentist? Again I refer to Ontario—the filling of prematurely decayed teeth is his most time-consuming responsibility. Perhaps if dental predestination due to maternal ignorance during the prenatal period is as true as we are led to believe, this is all there is left for him to do. I am not critical, I merely would suggest

that if it is possible of arrangement, the emphasis be shifted from a service to those unable or unwilling to secure it for themselves, to some well considered teaching effort which will be both practical of application and persuasive of appeal. If we must supply dental treatment to the vast bulk of the children of the country, then let us do it overtly as a form of socialized dentistry not thinly coated with the whitewash of prevention.

The mental hygienist—what of him? The present-day classroom is composed of a varying number of individuals, about 40 in number, each with his or her own degree of intelligence, each with emotional responses sometimes difficult to catalogue, physical imperfections not always easy to diagnose, and social reactions often not readily interpreted. This heterogeneous mass is supposed to be guided toward a vague but common objective by a teacher who at best can merely skim from the top of the pot what appears at the surface after stirring.

Our previous teaching program encouraged the studious child to be more studious and forced the restless soul to greater degrees of restlessness. In our early attempts to aid in a better adjustment of the child to his social and academic strait-jacket, we found the emotionally unstable and potentially psychotic among those viewed with favor by the teacher and the constructively minded among the rebellious. Much of our effort was viewed with veiled scepticism by the less well informed teacher, who believed that mental hygiene was concerned solely with the removal from among her pedagogical responsibilities of those with an intelligence quotient below 80. Unorthodox behavior and evidence of emotional instability were, to her, classroom problems which could be handled by disciplinary measures. It has taken much in the way of persuasion to impress on such teachers that it is the psychologist and not the psychometrist who is best equipped to fend off the need for the psychiatrist. Fortunately, the true mental hygienist is a happy blending of all these and truly he has a place in any school health program.

The physical educator had an established status in the school prior to the advent of the school physician, nurse, or psychologist; he was originally a drill instructor, owing his position to the inclusion of a modified form of military drill in the school curriculum in Ontario. Friendly rivalry between neighboring schools as to smartness of appearance and skill in maneuvers kept this movement alive after even its most ardent advocates could no longer defend it on the score of its contribution to the physical fitness of the bulk of the school population. Formal gymnastics introduced by admirers of the German and Scandinavian systems of mass physical activity were avidly seized upon by those groping for some synthetic substitute for the more spontaneous types of exercise. The innate instinct which prompts a child to jump, climb, throw and run could not, however, be long misdirected in unnatural channels, and today we find the leaders in this field not only appreciative of the necessity for providing exercise suited to the needs of each child, but likewise awake to the fact that only that type of physical effort that intrigues and maintains the interest is likely to have any material health significance. Pleasurable periods of relaxation, intriguing forms of group and individual activity are now part of the well ordered school program. Physical activity is an essential factor in optimum health. It is integrated into our work and play from infancy to old age, and directly or indirectly influences man's moral and social habits as well as his physical behavior;

but I might warn the ultra-enthusiast that it is neither the be-all and end-all of child health, nor the panacea for all the ills of mankind.

In conclusion, I would say, first, that much that has been done in the field of school health has been done well and may serve as a useful basis for future effort; much, however, has been indifferently done; and some should never have been attempted. Second, that a well directed interest in the present and future health of this age group is a responsibility jointly shared by the educational and health authorities. Third, that the grade teacher is the individual who has the greatest single contribution to make to any worth while type of school health program, and the special fields of effort with which most of us are concerned, are merely designed to aid the teacher in the better doing of his or her job.

Sunlight and Health

THE number of abnormal conditions primarily and specifically benefitted by sunlight, natural or artificial, is small in comparison with the number for which such claims are made. Sunlight constitutes one of the benefits of an outdoor life; it is one of the elements of climate that make for physical and mental well-being: in extrapulmonary tuberculosis, when judiciously used, it aids and promotes healing; in rickets, certain wave-lengths are specific; but these facts do not justify the extravagant claims made for it as a vitally necessary curative and preventive agency.

Certain diseases and disabilities are partly due to deficient radiation, and doubtless the health of the community may be improved by providing more artificial radiation where sunlight does not reach the small minimum required for health; but sunlight is only one of the many environmental factors that influence health. Climate in its relationship to health is not merely a question of sunlight, but of fresh air, wind, temperature, humidity, altitude above sea level, etc., as well. . . . Sunlight plays a subordinate part in the regulation of physical and chemical processes that make up the life of normal man, who can get along with little or practically none of it, provided his diet be adequate and that he take care of himself in the way of getting plenty of fresh air, sleep and exercise. . . .

Owing to the hypersensitivity of many infants and adults caution should be used in the use of sunlight, both natural and artificial. Over-indulgence, even in the normal, is foolhardy."—Henry Laurens, Professor of Physiology, Medical School, Tulane Univ. *The Scientific Monthly*, *Apr.*, 1936, pp. 312–324.

Effect of E.R.A. on Local Programs*

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THE four agencies in Minneapolis chiefly affected by E.R.A. health and nursing projects were the Health Department, the two public hospitals, and our own association in conjunction with the Department of Public Relief. The two ventures upon which I wish to dwell are, first, that of our City Hospital, and that with which our own organization was associated.

A year ago, when their project started, the Minneapolis General Hospital had on duty approximately 45 general duty nurses, and 135 students. They were faced with the opportunity and the problem of absorbing 75 graduates. They did it, and did it with satisfaction to themselves—to repeat, they added 75 nurses to a general duty staff of 45, and did it successfully almost over night.

The group was composed largely of recent graduates from a number of schools. One problem was introducing them to the routine of the General Hospital as quickly as possible. Motion pictures of certain procedures were helpful. They were of making the empty bed, postoperative bed, showing the morning and afternoon toilet, and the bed bath. The nurses were divided into smaller groups for demonstrations of certain special treatments, such as hypodermic technic, catheterization, etc. A head nurse was assigned to look after the group. The nurses were placed where their experience and their special interest indicated, excluding only the operating room, and for the most part night duty.

This plan worked, and made unquestionable contributions. To the patients it meant more complete care. To the students it meant that they were engaged in only such nursing activities as were educational. To the E.R.A. nurses themselves, it meant experience in a large hospital and an opportunity to demonstrate ability. Nine of them have taken civil service examinations and are now regularly employed at the hospital. This set-up lasted just long enough to show that it could be handled. However, as restrictions became more closely drawn, the 75 nurses dwindled to 8, and when the E.R.A. work terminated last August, it was not a particularly significant project.

The hospital had at that time, however, another project, the cessation of which was a serious handicap. During the past year maid service had been supplied up to as many as 75 women at one time. They had not had formal introduction as had the nurses, but had been assigned to head nurses according to the requisition of the latter. They relieved the nurses of much work which they had of necessity been doing. Julia Miller, R.N., superintendent of nurses, writing about this in July said, "At present it would be impossible to function at all, at our

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present standard of nursing care, without the E.R.A. maid help. Every hour of the nurses' time is thus made available for patients' care."

The E.R.A., I might add, penetrated to practically all the departments of the hospital, out-patient, business office, store room and sewing room, laundry, electro-cardiograph department, diet kitchen, record library, laboratory, and X-ray department. Why all this help could be utilized is indicated, I think, by the fact that in 1934 the patient load had increased over 1930 by 35 per cent, and the expenditure had made only half that increase.

And now, postponing comment, I will turn to the other project, the visiting housekeeper project. This was set up by the Department of Public Relief primarily for families on relief, and fitted into the framework of the Visiting Nurse Association in the belief that the nurses with their intimate contact with families could guide and utilize it to excellent advantage. The Visiting Nurse Association provided office space, transportation, and supplies. In conjunction with the nursing staff of 40, and later of 65, there were for 14 months an average of 5 nutrition workers directing 61 housekeepers.

The purposes of the plan were two; to provide a project for women on relief, and to assist families on relief in budgeting, buying, menu planning, and household management. The plan was to have the housekeeper make effective the teaching of the nutrition worker by demonstration in the home. The nutrition workers were carefully selected home economics graduates. One acted as director of the project, and the others were assigned to individual districts where they were in daily contact with the nurses, and exposed to the nurses' daily work. We were fortunate in having a group which grasped the nursing program and many of its potentialities and problems very quickly. We were allowed free selection also of the women who were sent to us for housekeepers; if because of personality or experience one seemed unsuited to the program, she was not retained. Each housekeeper came first to our central office where she met the director of the project, who discussed her experience and her special aptitudes. She gave the housekeeper a general idea of the program of the association, and stressed her responsibility in representing it. The housekeeper was then assigned to one of the nutrition workers, and thereafter reported to her. The nutrition worker took up any case on which she planned to send the housekeeper in detail with the latter, went with her to introduce her to the home, and if it were a long time case visited occasionally. If one of our nurses was active on the case the nutrition worker did not make supervisory visits unless there was a special problem. Classes were held for the housekeepers twice a month at our central office, the subjects including food essentials, getting the most for your food money, planning well balanced dietaries, diets of children, and stretching the clothing dollar.

The nurses too received a great deal from the nutrition workers. Since many of the families which we were carrying were on relief, it seemed perfectly justifiable for the nutritionists to devote part of their time to promoting their service through the nurses, and they held classes in the substations, at first every 2 weeks, and later once a month. Both the nurses and the field workers in the Department of Public Relief turned to the nutritionists frequently for advice and guidance for individual families.

Just how the service functioned is illustrated briefly in the case of the Beck family. The nurses had known the family for several years. The

mother had died of tuberculosis leaving Mr. Beck and three daughters, aged 17, 15, and 12. They were on relief, and Mr. Beck was doing his best to keep house adequately. Nevertheless, last summer the girls had lost considerable weight, and at the nurse's request the nutritionist visited the home. Finding Mr. Beck fairly intelligent, and very eager for help she explained the principles of good nutrition to him, and left with him some low cost menus and recipes. As the nurse was not active, the nutrition worker made a return visit. Mr. Beck had maintained his interest, and was including green vegetables and 4 quarts of milk in the diet, and carrying out suggestions in various other ways. The nutrition worker invited him to attend a bread making demonstration, with the result that he became an enthusiastic bread maker. As he did not understand the preparation of certain foods, and was anxious to do some canning, a housekeeper was sent to the family for several days. Mr. Beck asked for suggestions for school lunches for the children, which were provided. At the end of the summer the daughters had gained weight, the lowest amount being 7 pounds, the highest, 11.

I have cited this rather simple case to show the interplay between nurse, nutrition worker, and housekeeper, and the assistance which an untrained person can receive, if he desires it.

Last autumn a few of the particularly well adapted housekeepers were selected to give demonstrations of preparation of certain low cost foods at several of the settlement houses. Twenty-one demonstrations were held with an average attendance of 16. The project did not continue long enough to demonstrate to what extent this might be developed advantageously.

The project terminated with our organization last March because at that time the State Emergency Relief Administration felt that it could not be continued with the amount of supervision which we considered essential. We were sure too that it would be maintained under some plan by the Department of Public Relief. This proved to be the case; the project went on in much the same way in that department until August when the housekeepers were discontinued.

The question is, I think, what it accomplished, and what remained as residue after it terminated. What it meant to families is evident. They gained much or little, according to their intelligence and interest. When it was over the Community Health Service had on its staff one nutrition worker, for the Community Fund had agreed that nutrition teaching was fundamental to public health work. The project left us too with a staff of nurses conscious of nutrition and appreciative that it is a fundamental part of health teaching. They are turning to our nutrition consultant for assistance as they probably would not have done had they not had the more intensive experience.

The Relief Department still retains 4 nutrition workers on the S.E.R.A. administrative pay roll. They are acting as consultants to the field staff, having classes and conferences much as our own nutrition worker is doing.

E.R.A. is ended, the W.P.A. and possible other governmental enterprises are before us. Our experience, as I have indicated, was a happy one. E.R.A. workers were never substituted for staff personnel; they were an addition to it. According to our ideas of a few years ago, hasty development of so much service as indicated to the General Hospital and Community Health Service, would have seemed impractical; yet the plans worked, they contributed to patients and to the agencies, and they were worthy of the workers.

Comparative Value of State Districts and County Districts as the Basis of Local Health Organization*

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A SOUND public health program must operate economically as well as effectively. A small unit of population as the basis of organization means either an inadequate service or a high per capita cost. It matters little in the long run whether the funds be derived from local, state, or national sources. Even the gifts of philanthropists must be expended with an eye to the time when those gifts will cease and the organization must be supported from taxes. A splurge of spending means a later readjustment which may be not only painful to the employed personnel but disastrous to the community.

During the past 20 years the county as the unit of local health administration has been so vociferously acclaimed that other methods have not received the consideration to which they may be entitled. There can be no quarrel with the contention that whole-time service is a necessity both in directing and operating effectively local, as well as state and national, health organizations; nor is there objection to be found to the county as the unit of local organization, provided the county contains a sufficient population, sufficient wealth, and sufficient intelligence to support and operate a health department commensurate with the local needs.

That these qualifications are not universally satisfied is easily demonstrated by the census figures of 1930, which show that among the 3,072 counties of the United States, 10 had less than 1,000 population, 250 less than 5,000, nearly a quarter less than 10,000, 40 per cent less than 15,000, over 55 per cent less than 20,000. Over 90 per cent of the counties in the United States were organized before the telephone, the automobile, and good roads made their contributions to communication.

Within what limits of population a health unit can operate effectively and economically has not been determined with any precision. It is not a fixed figure for all present services for all parts of the country or for all time. Our concept of the content of the public health program will change with time quite as surely as it changes with place today. However, there is certainly a lower population limit, and at least one-half of the counties in the United States are below it.

There is probably an upper limit also. The large cities of New York and Baltimore have felt the need of decentralizing and are working toward the establishment of district organizations,

* Read before the Florida Public Health Association at Orlando, Fla., December 2, 1935.

without, however, surrendering the authority of the central office, exacting payments from the districts as such, or supplying personnel and services in accordance with the taxes derived from the areas served.

The vast propaganda for county health departments has two serious evils which must be substracted from its unquestioned benefits in reaching a balance. In the first place, it has emphasized a *name* which covers a variety of services ranging from very little to something approaching adequacy. A whole-time health officer is the single qualification required for admission to the glorified list of "organized" counties. A budget of $4,000 which pays the salary, traveling, and office expenses of a whole-time health officer places a county among the anointed. This is a distortion of values, gives on the one hand a feeling of security and superiority unwarranted by the facts, and on the other arouses alarm over the state of the nation, four-fifths of whose rural territory is not protected by a locally employed whole-time health officer. At least every one in health work has heard of Cattaraugus County, N. Y., and Rutherford County, Tenn., and when the term county health department is used some such organization is visualized. There is as much difference in the existing county health departments as there is in the automobiles seen on the highways.

That there is little to be hoped for in providing the accessory personnel and expenses necessary to the performance of a good journeyman job of health work in small rural counties is attested by the history of these organizations. "Progress," in certain states, consists almost entirely in the establishment of more of the same kind of inefficient or semi-efficient "units." Mountin[1] states that "the budgets of rural health departments tend to remain on a constant low level." Certain state health officers have sought to overcome the difficulty of small county organizations by the consolidation of two or more adjacent counties into districts of suitable size, relying upon their persuasive powers and a subsidy to obtain the consent and coöperation of local authorities in such an arrangement. That these consolidations are difficult to accomplish is indicated by the fact that only 21 of them, comprising 57 counties, were existent in 1934; that they are instable is indicated by the number that have been discontinued or re-grouped.

It is questionable whether anything less than reforming our counties on the basis of modern facilities of communication and modern needs of public service can make the county universally satisfactory as the unit of local health administration. Until this reformation is brought about, such counties must be left in outer darkness, find a suitable and willing mate in the neighborhood, or another method must be developed which will deliver the health service to which every community is entitled.

The second evil to be charged against the propaganda for county "units" is that its very effectiveness has succeeded almost in monopolizing the thinking of public health administrators, of those responsible for the health activities of the philanthropic foundations, of the rank and file of official and voluntary health organizations. The alternative method of state health districts has not received the consideration it deserves. It has never been thoroughly explored in theory and until recent years has not been carried in practice beyond its primitive beginnings. That it possesses potential advantages which in certain respects outweigh those of the county health department I hope to demonstrate in this paper.

1. Under a broad permissive law such as that in New York State, the com-

missioner of health may create any number of sanitary districts, being limited solely by the number of district health officers provided in the legislative appropriation. Either within such a limitation or one specified within the legislative act itself, districts may be established which provide an area and population suitable to the requirements of efficient administration. The effort ordinarily necessary to "sell" a county health department to a reluctant county board can be applied with equal or greater advantage to the state appropriating authorities.

2. Such a system provides a sound foundation for "a career service in which standards of ability and professional qualifications constitute the exclusive basis of preferment."[2] Without such a foundation a career service in public health must ever be hazardous, dependent, beyond the current term of office, on the vagaries of local politics, local prejudice, local whims. It is common experience that a local appointing officer or board will appoint a non-resident only with great reluctance, whereas they will accept a non-resident appointed by an outside authority without resentment. His subsequent success or failure is a matter of his personal and professional qualifications.

Within an established corps, promotion can be systematized, ability rewarded, and mediocrity absorbed in subordinate positions. Individuals exhibiting a flair for some specialized branch can be aided and encouraged to perfect their training in that specialty with assurance that a suitable outlet for their abilities will be available. Such a career service can best be protected by an established state civil service including other departments of the state government.

3. The selection of the district health officer, the determination of the number and quality of accessory personnel under him, and the operating expenses can be based on the needs of the district and not on its ability to pay. To quote again from Dr. Bishop's presidential address[2]: "frequent observations show that the regions with the smallest resources are confronted with the largest need for health service." This is true also of other government services, notably education, and the situation is not met adequately with grants-in-aid that require matching by local funds. No city apportions its services to its several wards according to the amount of taxes collected from them respectively. Nor does it demand that in order to receive a service a section shall pay an additional price. Why should the state make this demand?

As a matter of fact, need and ability to pay probably show an inverse correlation of a very high order, and the same justifications that exist for grants-in-aid hold for supplying the services without conditions. That epidemics know no local political boundaries has become a platitude. That the uncorrected defects of childhood and the neglect of such chronic infectious diseases as tuberculosis and syphilis may impose their later burden of expensive care on a community far away from their origins is not so well appreciated. Americans are migratory—23.4 per cent of the people enumerated at the census of 1930 were born outside the state in which they were residing. We have no figures on the unquestionably greater migration within state boundaries.

4. The poorer districts need in all probability not only more personnel per capita, but a better trained personnel and a directing head of the highest order. The reverse obtains under ordinary circumstances. The small "organized" county with limited resources is the one with the untrained or inexperienced health officer with no assistants, who, if he be young and ambitious, looks upon it as a stepping

stone to something better. He receives such direction, supervision, and advice as a director from the central office can spare him in common with perhaps 20 to 70 others. As the health officer of a small district he probably receives less attention than his more "important" brethren. Would it not be better for him, for the district, and for the service, if his district were part of a larger one, if he were an assistant on a larger staff, if he were learning under direct supervision, if he were acquiring training in handling subordinates, in using clerks and stenographers? Would not the sanitary inspector work better under the supervision of a sanitary engineer, the nurses under a supervising nurse? The lives of some of these supervised people might not be any happier, but I am sure that, whatever their monthly reports might say, their work would be more purposeful and more effective. Accompanied by appropriate reading, this in my opinion far excels as a training program anything to be expected of a "short course" in a public health school or a "training center." It can and should be designed not only for health officers but for sanitary engineers, inspectors, and nurses.

5. As a state district is not fixed by a unit designed for general governmental purposes, its boundaries may be changed from time to time with a minimum of formality. County lines are usually observed to avoid more than one district officer's dealing with the same county board, but a county may be transferred from one district to another or even made a separate district with little disturbance. This is a decided advantage over the county unit system since it provides a coverage for the entire state, which even though it may be thin is not so thin as that to be expected from a central office. The size of the districts may be adapted to the capacity of the officer in charge, and districts may be subdivided and readjusted as personnel is acquired and trained.

6. The personnel being appointed and paid by the state, the authority is direct, there is greater identity of purpose and there can be a higher degree of uniformity where that is desirable. At the same time, it does not interfere with careful experimentation in the field of administration. This centralized authority also permits prompt concentration of personnel at points of particular danger as in epidemics or disaster.

7. It eliminates local politics, especially if more than one county be included, from the selection of personnel and headquarters, the making of purchases, and prevents the other devious devices which tend to reduce efficiency.

8. Highly specialized services provided by the state, such as for orthopedics, tuberculosis, syphilis, maternity and infancy hygiene, etc., can be readily integrated. These may cover more than one district. In the case of a large district or a specific problem, a specialist may be assigned.

9. It is more economical than dissociated units. Supplies can be bought more cheaply through a central bureau and the quality of the materials insured. Personnel of higher quality can be employed for the same or even lower salaries than are paid by local governments. The increased security against dismissal or demotion for arbitrary or extraneous reasons, the greater opportunities for promotion, the larger opportunities for self-improvement are attractions that appeal to men and women of the type needed in public health work. The problem of recruitment is thereby made less difficult.

It has been stated or implied [3] that local financial and official participation are essential to the acceptance and maintenance of good local health work. Lumsden cites the discontinuance of the

district system in Vermont after 4 years' experience with it "as an illuminating example of a state doing more than its proportionate part in local health service." I will not comment on the social philosophy which apparently underlies that statement, but merely point out the lack of evidence which would warrant the conclusion.

Ten state districts were established in Vermont in 1919, each with a district health officer. The total appropriation for district work was $40,000 per annum or an average of $4,000 per district. Presumably therefore there was no accessory staff and no district office. We are not informed as to the personal and professional qualifications of the district officers, whether they embarked on a program of wider usefulness than the part-time local health officers whom they superseded or fell into the rut of routine. In retrospect at least, one may question the wisdom of the precipitate creation of so many districts in so small a state. Fewer districts, each better implemented and giving a more varied and intimate service, might have survived.

Despite this casualty there are 6 states which have district systems without local participation.[4] Four have been in existence for over 20 years, 2 others for over 8 years. It is readily admitted that they have not been developed as they might have been with the possible exception of Delaware, which operates 3 state districts in its 3 counties. In part, this may be due to the difficulty of obtaining the necessary legislative appropriations. But in greater measure it may be due to a continuance of the original policy of supervision of local personnel, and failure to recognize and test the potentialities of the state district as an operating agency. As to its capacity for gaining local interest and support, the district system in New York State survived a concerted attack in its incipiency due to the support it received from people throughout the state. It has never been questioned since.

The results from increasing our district staffs in New York State during the past 5 years have been such as to encourage a continuance and expansion of this policy. It is not intended that this shall discourage the establishment of more whole-time health departments in counties desiring a more complete service than can be provided at present by the state. It means rather a change of emphasis. Our experience with the additional personnel made possible by a grant from the Rockefeller Foundation and last year's federal aid, has shown that it is possible to integrate the state and local services in rural districts and to supplement the local services in cities in a highly satisfactory manner. Relieving the district officer of much of the routine and emergency duties is making possible purposeful efforts in the prevention of syphilis, tuberculosis, and infant and maternal mortality. As personnel and experience are acquired, other imperfectly developed fields can be cultivated with greater promise of success than with locally operated departments.

Public health work in this country is at a critical point. The passage of the Social Security Act has authorized the Congress to appropriate considerable sums of money for grants-in-aid to our states and territories. Upon the wisdom and the integrity with which these funds are spent will depend not merely their continuance but perhaps the continuance of existing appropriations from state and local governments. I am not thinking of the possible "drying up" of local appropriations through a shift of the burden to the national government. I am thinking of an actual revulsion against health work if the money be diverted to serve personal or partisan purposes; if it be spent foolishly or extravagantly by the

well intentioned. The former can happen despite the qualifications that may be required for professional personnel; the latter can happen through grants that are not proportioned to the need or that exceed the capacity of the state or local health organization to administer.

There is some reason for concern in the emphasis placed on grants to local health departments in the tentative proposal of the Surgeon General for the allocation of funds under Section VI of the Act. Restricting the amount available for the central state health department to a fixed fraction of the total allotment may result in the maintenance of those departments at a level incompatible with efficiency. They will thus be unable to furnish either the amount or the quality of service to the local departments that the latter require. The quality of the work of the state health department largely determines that of the local departments. Rarely do they rise above it. When they do, it may well be a cause for shame that the state standard is not higher, rather than a cause for pride in the achievement of a local unit. The state must be prepared to furnish not only a high order of administrative guidance but a high quality and recognized leadership for the essential specialized services.

The proposed regulations of the Social Security Act provide that aid may be given to full-time district organizations, and state created and operated districts are therefore equally eligible with those established locally.

I submit that local interest and support can be developed for a system of state districts each under a whole-time health officer as well as for a system of locally operated departments. Public health service always expresses itself locally, whether in services to an individual, a family, a group, or to a community. Where that service comes from and what agency furnishes the funds are of less moment than the quality of the service and the spirit in which it is given. The state district system provides a service that can be superimposed on any existing system without undue delay or disruption, a universal coverage, not a mottled one, a service adapted to local needs rather than local wealth.

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Integrating Mental Hygiene*

From the Point of View of the Public Health Officer and School Physician

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THE keynote of enlightened attitude toward mental hygiene in the field of public health was sounded several years ago by the organizer of this Special Session on Mental Hygiene. In his wisdom and critical prevision Dr. Haven Emerson stated what has now become a well known accepted dictum:

> We have arrived at a point in the organization of our national effort for health where advances in the fields already preëmpted and liberally supported by public opinion and resources must wait for their entire success upon a fair beginning and progress in the most delicate and difficult and yet the most promising undertaking of all—the prevention of nervous disorders and mental defects.

The facts of the need and importance of mental health problems have been abundantly driven home statistically, through personal and group experience, and otherwise. We shall therefore proceed directly to the nub of our assignment, bringing to the front facts which make for collaboration between the public health officer and the school physician for the purpose of protective and preventive mental guidance of school age children. Our chief concern will be with definite practices and organization under official agencies of services directed toward the prevention and control of mental disease, and their precursors, personality and behavior disorders or maladjustments.

Perhaps the most fruitful approach to our collaboration is to begin with concrete examples of points of view with respect to mental hygiene, expressed by health officers and school physicians. If one is to be helpful to another, he must first gain an intellectual, but particularly an emotional, understanding of the facts under consideration; he must be able to put himself into the shoes of the other person in order to sense his mind-set and feel with him in his problems. Let us therefore swing into center-stage position the reactions of a number of public health officers and school physicians to our topic, keeping in mind that over 60 per cent of school physicians also function as public health officers in New York State. We shall first record the physicians' comments, follow them with an attempt at interpretation and evaluation, summarize these facts, and finally present a few concrete recommendations designed to enhance integration of mental hygiene opportunities and obligations. The substance of the remarks of certain health officers and school physicians relative to our topic follows:

1. " The average public health officer

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and school physician looks at mental hygiene as something beyond him. It really is not, but it seems so because he steers shy of it. Psychiatric language and technic is often so far removed from the practitioner's understanding and utilization that he does not take a serious interest in it. If he would only get into the habit of consciously applying mental hygiene principles and practices, he would soon realize his capacity and its value. It is something every physician can apply in his everyday practice. For example, during the physical examination of the school child, the physician has an unrivalled opportunity to inject mental hygiene attitudes and habits relative to the physical examination findings and the child's reaction to them.

"We must get away from the old idea that the doctor is only to detect physical defects. He must learn to prepare the child for the health education values of the examination by talking with and to the child; not merely examining him manually or with impersonal diagnostic instruments. His main job is to help prepare the child for healthier, richer, and happier living, chiefly through habit training in the maintenance of health and the prevention of illness.

"The proper emotional acceptance of the physical examination facts is essential. But the physician must not neglect tactful inquiry into the child's ways of living. His main contribution is assisting in the education of the child in the art of living—healthfully, wisely, happily and to the optimum of his potentialities."

The time factor was raised to which this former public health officer, school physician and school medical inspector replied: "The doctor has plenty of time. It is a part of his work, but he does not know it."

Asked how he would "put across" a better mental hygiene attitude and practice to school physicians and health officers, he replied: "The method will have to be individualized and explained in different ways to meet personality types and individual needs. Two-way conferences are perhaps best. Herein the physician has an opportunity to raise problems of interest and concern to him. The discussion conference under the chairmanship of an experienced leader multiplies the educational values of topics discussed through 'contagion.' Others are impelled to pool their experiences to clarify conceptions and that to the benefit of all concerned. The physician may be exposed to facts he already knows, but he gets to see them in a new and more significant light which in turn leads to more effective application of them."

2. "Most school physicians do not know what the words 'mental hygiene' mean. Their general attitude is unfavorable toward mental hygiene. An occasional doctor is all for mental hygiene, especially the full-time school physician. The part-time practitioner has not time to think of mental hygiene; he is too busy with obstetrics and other concerns of his private practice."

3. "My first concern in examining a child is to note whether he appears to be well adjusted, well poised, happy, or whether he is fidgety, tense, or nervous. Evidences of the degree of personality integration can be observed before one can accurately note the child's color, nutritional status, and the details of the various organ-system examinations. Too often, the first and often the only concern of the school physician with the maladjusted pupil is to recommend him to be dropped or exempted from school. He does not seem to be interested in the pupil's further plans and welfare."

With respect to psychiatric part-time service to schools and colleges this school physician stated: "The

inability of the psychiatrist to give sufficient time to the treatment of maladjusted pupils makes his services often unsatisfactory and less convincing. Full-time psychiatrists on the teaching faculties of schools and colleges would help fill a patent need."

Asked as to the need of special training of school physicians in mental hygiene for better serving this part of their work, the informant answered: "The main thing is to use good horse sense."

4. "A few outstanding school physicians see the importance of mental hygiene in handling the child. It colors their outlook and understanding of the child's adjustment to life. They see the whole child.

"Many older physicians have a keen eye for mental hygiene values; others just ignore it and the understanding of problems of pupil adjustment. The recent graduates seem to be doing a better job, perhaps due to better medical school training in this branch of medicine. They see the whole child and have his total interests and welfare at heart.

"The school physician could get much help from teachers in gaining an understanding and handling of pupil maladjustments. The full-time physician usually coöperates well with the teachers. Teachers are usually better prepared by training and experience than the physician in understanding and handling behavior and personality difficulties of pupils. The teacher has the advantage of being in intimate contact with the child some 5 to 6 hours each day. However, the teacher needs the advice of the physician, especially in evaluating his physical status. The school physician could and should be trained to interpret most cases of pupil behavior difficulties and emotional maladjustments, and to treat these quite effectively. The more serious cases should be referred to a psychiatrist attached to the school staff, child guidance clinic, hospital dispensary or the psychiatrist in private practice."

Asked how a school psychiatrist could utilize his time to best advantage to the child with respect to the early recognition and correction of emotional, personality, and social maladjustments, this school physician replied: "Working with the teacher. It is she who is in closer contact and for a longer time with the child, and therefore could do a better preventive mental health job.

"The school physician can play an important rôle in corrective and in positive mental hygiene. The teacher, upon discovering a maladjusted child, usually refers him to the school principal or superintendent who in turn usually seeks the advice of the school physician and school nurse. If the problem seems to need more specialized analysis, psychiatric service is sought.

"Not infrequently, the teacher herself is maladjusted, and is not in a position to understand and handle pupil maladjustments. Thus psychiatric and mental hygiene service should also be available to help teachers handicapped by personality problems.

"The mental health examination should be an integral part of the general physical examination. This is not being done to any great extent at present. The concern of the school physician should extend beyond checking off the mere presence or absence of 'mental abnormality' on the physical examination form.

"The mental health service given by the school physician could be materially improved by realizing the need for special education and clinical experience in this specialty beyond that which he obtained at medical college. Summer and extension courses such as those given at Columbia University to school physicians could be turned to good advantage. But of chief impor-

tance in gaining a working knowledge and practice of school psychiatry is the actual work in a child guidance clinic or psychiatric dispensary, or assistant to a psychiatrist dealing with school age problems. Zone discussion and panel conferences with health officers and school physicians have been of practical help, but there is needed a greater readiness on the part of the physician to seek the services of the psychiatrist in sharing with him behavior and personality difficulties, especially at an early period before serious maladjustments such as delinquency and crime develop.

"Frequently health officers and school physicians are not aware of the local psychiatric facilities available, or they fail to utilize them to the full for various types of mentally and socially maladjusted children. The school principal and superintendent are often better aware of the need of child guidance clinic service than the physician. More education and experience in child development, child psychology, and child psychiatry in pre-graduation days would be of decided advantage to the physician whether he entered general practice or any of its specialties. Relatively few school physicians and public health officers read mental hygiene periodicals or books specializing in this branch of medicine. There is need of jarring many physicians out of the rut of *laissez-faire* methods of regarding and treating the maladjusted child."

5. "The school physician is so busy with looking for physical defects that he skips the mental hygiene opportunities of his work, unless the teacher calls his attention to the pupils' abnormal mental status. The doctor's recognition as to what is mentally abnormal is not very keen. He is schooled in the study of medicine chiefly as a study of disease, rather than prevention of illness and the maintenance of health. Thus the school physician by virtue of only general medical training is handicapped in doing a reasonably good mental hygiene job. On the other hand, most school physicians and health officers would be sympathetic toward mental hygiene if at any time in their career they had been 'sold' to it. As yet, it is beyond their experience. The older physician's psychiatric training consisted in the observation of mentally diseased patients committed to mental hospitals. He has had no instruction in preventive psychiatry or mental hygiene.

"The medical curriculum should be made over. Much of the time spent on histology, for example, should be given over to the study and practice of preventive medicine, particularly the early recognition of conditions and hazards that make for eventual mental breakdown; the prevention of goiter and other preventable and controllable disorders.

"The health officer and school physician could be made psychiatrically intelligent by devising methods which are simple, quick, and concrete for the assimilation of mental health concepts and technics. A 'ten point' formulation of this nature might arrest sufficient attention to spur on non-psychiatrically educated physicians to apply mental hygiene.

"At present, mental abnormalities are brought to the school physician's attention by the teacher, and occasionally the parent. He is willing to coöperate with the teacher, but he does not take the initiative and so this important relationship is often lost. The school physician should talk over each pupil with the teacher before he examines him.

"Mental health should be the first item on the school physician's examination blank. 'Nutrition' might well be displaced to 18th place because

you cannot adequately evaluate it until the pupil is stripped.

"If it were stated in the school physician's contract that the time he must give to the examination of each child per year should occupy a minimum of 30 minutes, the mental health aspects would find less chance of being lost sight of on account of the time factor. Of course, reasonable financial recompense for the physician's time is essential if the pupils' optimal welfare is to be realized."

6. "Some school physicians are so mind-set about their job that they think in terms of so many physical examinations and see how quickly they can get them over.

"Certain physicians have a natural knack of understanding and handling children. But relatively few physicians (general or school) give attention to the mental hygiene aspects of their work. They do not seem to feel need for it, especially those who need it the most. Those who do use it, welcome it. The dentist has made more progress in mental hygiene than the physician. Probably this is because he deals so much with pain and has to be quite expert in psychological medicine to hold his patients. The bedridden patient on the other hand, cannot escape from the physician. Perhaps also the cosmetic attention to the personality in contrast to health status gives the dentist a psychological advantage over the physician who fails to emphasize the health-beauty aspects of his services."

7. "Since over 50 per cent of medical practice is essentially involved in handling mental and emotional difficulties of patients, how can mental hygiene be regarded as a specialty? The general practitioner and school physician must be the main bulwark in treating extramural types of personality and behavior abnormalities. Besides, personal experience with certain psychiatric help has been disappointing and on occasion has led to an increase of troublesome situations."

8. "I acknowledge the immensity and seriousness of the problem of the mentally maladjusted but I do not feel more time and money are at present justified in supporting this branch of medicine until more prompt, effective, and reliable measures are forthcoming. There seems to be nothing in treating mentally maladjusted persons as specific as diphtheria antitoxin or typhoid vaccine. For the present, therefore, service to the mentally handicapped should be regarded as 'dessert' until the physical welfare of the individual is cared for to the fullest extent."

9. "Recently I was asked to give an address on mental health to a lay organization. As a health officer, the people of this district looked upon me as the source of all health knowledge. Although I laid no claim to being an expert in this branch of health, I gave the address. Somewhat to my chagrin I found out after the meeting that there were in the audience a psychiatrist and a psychiatric social worker. But I do not regret the experience.

"I feel that every health officer should obligate himself to gain a working knowledge of the essential facts of mental hygiene. His job is not only looking after the physical welfare of his community, but also its mental health. And this does not imply merely the commitment of persons so mentally ill as to require hospital treatment. It primarily devolves upon him to *prevent* such conditions as far as is within his power and opportunity. Mental hygiene clinics and observation wards in connection with general hospitals and health centers are essential to the early recognition and treatment of the community's mentally ill and maladjusted."

What shall we say about the foregoing opinions of experienced health officers and school physicians? Their

reactions seem to be a representative sampling of feelings and thoughts entertained on the present-day status of mental hygiene. The attitude of these health workers for the most part is decidedly encouraging. To a large extent they have pointed the way to solving most of the problems which interfere with the optimal integration of mental health from the point of view of the health officer and school physician. If the constructive suggestions formulated by these physicians were capitalized, what an impetus would be given to this important branch of medical service!

By way of summary and formulation of a " ten point " program of mental health basic attitude, knowledge and practice for health officers and school physicians, the following guide-posts are erected:

1. The attitude toward, and concept of, health must be amplified to include the optimal functioning of " the person," the individual as a whole. In the short historical march of preventive medicine, we have outgrown our concept of preventive medicine from that of primary concern with the prevention and reduction of human misery due to disease and death. We are no longer merely concerned with longevity *per se,* but the quality of human performance in terms of health, happiness, efficiency, and social adaptation. If we subscribe to this concept, we will stop thinking in terms of mind and body, realizing that they are inseparable and part and parcel of the same thing. We will strive to obtain the biological, psychological, and environmental needs each individual peculiarly requires to develop his constructive potentialities to the optimum.

2. The health officer and school physician should realize to a greater extent their unrivalled opportunity to build the foundations of the total health of the individual by virtue of their educational service to the unborn child, the parents, and their intimate contact with parent and teacher during the plastic period of infancy and childhood. If the foundation of health structure is faulty at its origin, the whole superstructure is jeopardized. The welfare of the child each year depends on the health of the child during the preceding years. Therefore, the best time for realizing our objectives in healthful living on all levels of integration—biological, psychological, temperamental, and social—is during the period of infancy and childhood. Are health officers and school physicians fully aware of their latent and potential possibilities in this regard?

3. Mental health may be regarded as the expression of the individual's adjustment to life in terms of *emotional* satisfaction in the light of his capacities, needs, demands, and opportunities. These depend upon the quality of the individual's original stuff or constitutional endowment, the environmental situations and life experiences affecting him, and how he adjusted and reacted to them from birth onward. Of prime importance are the quality of behavior, feeling-attitude, and compromise patterns woven into the warp and woof of his growing personality. These are the first line of defense of his ability to meet life demands and vicissitudes. Health is essentially a way of living, a dynamic-genetic functioning of the total person seeking satisfactions of his primordial instinctive-emotional component of his being, the mainspring of activity. Behavior is merely a symptom to be interpreted in the light of the individual's reaching out after satisfactions and needs. Behavior is just as much an integral expression of health as is health expressed in behavior. Since the individual reacts always as a total unit, the physical component of the personality should be functioning at its optimum in order

that he may capitalize his day-by-day adjustment demands and opportunities. The soil or hereditary aspect of mental health is important to recognize from the standpoint of positive eugenics and the fostering of the health of coming generations. But apart from the evaluation of individual constitutional endowment in terms of ability to stand emotional stress and strain and the correlative obligation for protection of the child from undue environmental pressure, the chief concern of the physician is in shaping the environmental stimuli so that reasonable success and satisfaction in living with others will be the lot of every person.

4. The school physician should pay special attention to every child who is experiencing failure in school, who is a misfit in the group, educationally or socially, who is unhappy and protesting thereto with " nerves." It must be recognized that fundamentally no child wants to fail. Failure means only one thing—that someone has blundered; someone has failed to show him off to advantage on his own level of ability to succeed. Every child wants to succeed, win social recognition and approval, and experience a wholesome sense of prestige and power—and he will, if we obligate ourselves to understand thoroughly the child's nature and needs and see to it that these are reasonably satisfied.

5. Just as the physician needs to know certain facts in evaluating the physical health of an individual, for example, temperature, pulse rate, blood pressure, blood and urine analysis, and other data, so in the evaluation of mental health we must seek facts of the individual's intellectual capacity, special abilities and disabilities, interests, aptitudes, and talents, as well as his mental conflicts, anxieties, frustrations, ambitions and their discrepancies with reasons for failure of actualization. The physician must familiarize himself with the meaning and estimation of intelligence tests. A large number of pupils complaining of " nerves " and failure in school are so because of the emotional strain resulting from lack of intellectual ability to succeed in the work expected of them. Conference with the teacher in every case of behavior and personality maladjustments is essential for interpretation and reconstruction of the problem. The facts of internal mental disharmony require time and the capacity to attain the pupil's rapport before he will unfold his thwartings, strengths, and weaknesses, anxieties, fears and ruminations. The environmental facts of home emotional atmospheric pressure due to stress and strain must be sought through visiting teacher or social worker, school nurse, or other sources. The enucleation or modification of emotional conflicts absorbed in this area of the child's life may be the means of restoring mental equilibrium. Usually a multiplicity of causes or variables are operating in unbalancing the blending of assets and liabilities. Likewise, it is important to keep in mind the desideratum of a multiplicity of results.

6. Work through pupil strengths and satisfactions to overcome undesirable attitudes and practices. Wholesome substituting, balancing and protecting interests and activities are frequently sufficient to crowd out morbid preoccupations and undesirable habits. Let us keep in mind that just as necessary as food, shelter, and clothing are for each child's physical welfare, so for his mental and emotional health are necessary varying degrees of affection, feeling of security, and belonging to the group, freedom to unfold and organize his creative capacities, and the opportunity to experience reasonable satisfaction of wish strivings and biological urges in everyday living.

7. Learn the normal latitude or range of psychological developmental facts

of behavior. We all more or less present *normal problems* of social adaptation and personality unfolding at various periods of the life span. These may be primarily related to endocrine or situational changes as well as to new integrations ever evolving in mental life organization with consequent shifts of methods in gaining satisfactions.

8. Seek to appreciate better the individual differences in original equipment, reaction patterns to life experiences, arrests in intellectual and emotional development and the causes hereof. The child's creative abilities, probable educational and vocational goal as well as avocational interests deserve particular attention. Create the optimal conditions for success in unfolding and capitalizing constructive individual differences. Cultivate constructive deviations from the norm in creative interests and abilities since it is only through these that human progress is made. One hundred per cent regimentation of human material spells psychic arteriosclerosis and retrogression.

9. Recognize that the home is the most important mental health educational institution of society. Bend every effort to see that every child has this part of his birthright guaranteed. If the start of life's journey is well prepared, we have little fear of maladjustments later on, although it must be kept in mind that human machinery may go awry at any point along the life span, but perhaps 10 to 50 per cent of mental maladjustments are entirely preventable and therefore a prime obligation of the public health officer and school physician. This aspect of health is essentially as important as the individual's and community's physical welfare. As in the treatment of the tuberculous, there is no cut-and-dried specific method of treating the mentally maladjusted. Similarly their reconstruction through reëducation in the art of living may take a period of months or years. But who would say that because we have no quick-cure specific for the treatment of the tuberculous that we will not concern ourselves with their welfare until sure and quick readily applied remedial measures arise? Likewise the tackling of the problems of persons handicapped by venereal diseases and the challenging problem of cancer merit concerted and intensive preventive therapeutic services, largely through public health education. The problems of the mentally afflicted are in no wise less real or less pressing for solution, but rather more so in view of their far greater incidence. Rational educational enlightenment, oftentimes over a long-term period, is necessary to uproot taboos and defenses handed down from one generation to another from the dark ages, and other sources of ignorance.

10. Although we can never dispense with common sense, who would think of practising surgery or any medical specialty without having his "horse sense" critically trained before presuming to be competent or venturing far in these respective branches? Postgraduate education, clinical experience, reading, and the putting to a test of diagnostic, preventive, and therapeutic aspects of psychological medicine, are essential for adequate service until our medical colleges can be won over to give more time to this part of the physician's education. Even then, there will always be plenty of room for the expert or specialist.

The success of the mental health of the individual and the community depends upon the *combined* efforts of the medical profession, professional educators, the clergy, parents, and every constructive socializing agency of the community. The multiplicity of forces shaping human behavior touch the total child every moment of his 24 hour living. It is therefore obvious that only by *sharing* our common obliga-

tion and opportunity according to our several special qualifications, trainings, and experiences, can we hope to do justice to the total health of those for whom we make ourselves responsible. The spearhead of any health program should be made up of those who are best qualified by education and experience to direct and evaluate it. If the medical profession fail in this, our nation's first obligation to the child, to whom can we look for guidance? The sampling of expressions brought to your consideration in this paper clearly indicate the recognition of need and interest of the health officer and school physician in matters of mental health. We dare not, and will not fail in this most challenging and promising opportunity.

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May Day—Child Health Day

AT the request of the State and Provincial Health Authorities of North America, the Children's Bureau of the Department of Labor has undertaken the responsibility for May Day–Child Health Day.

According to an announcement made April 8 by Katharine F. Lenroot of the Children's Bureau, the program for 1936 is to be centered on social security for children with special emphasis placed on health protection.

The assumption by an official agency like the Children's Bureau of this function previously carried by the American Child Health Association in coöperation with the State and Provincial Health Authorities marks a significant milepost in the development of May Day–Child Health Day as a point of departure for health department services.

A Community Program for Prevention of Mental Disease*

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THERE is a steady increase in mental disorders, for some of which causative factors are recognized, but no community has inaugurated a specific and continuous plan for their prevention. They, like all diseases, will be decreased not by therapy for the individual, but by mass prevention.

Medicine has contributed to civilization's progress largely through preventive measures learned from treatment; therefore, the prevention of disease is a major function of modern health agencies. Lay organizations, supported by private funds, and public health departments, maintained by taxes, no longer confine their activities to therapy. Many physicians work as hard to keep people well as they do to cure the sick. The medical profession and boards of health do not yet recognize that the prevention of mental and emotional disorders—or mental hygiene—falls within their province. No community has an organized program for the prevention of mental disease.

In the *Journal of the A.M.A.*, March 30, 1935, Dr. Ray Lyman Wilbur discussed the weaknesses of our medical curriculum, and mentioned specifically the departments of psychiatry, public health, and obstetrics as those in which improvement is definitely needed. If the teaching of these subjects has lagged, we know least about them and may be unable to appraise their possibilities. Nevertheless, we are offering for consideration a possible relationship between two of them, psychiatry and public health, and inclusion of one in the other, by a community program for the prevention of mental diseases, with special emphasis on those of psychogenic origin, the causes of which we are more able to influence than those of organic origin.

Except in the mental changes resulting from syphilis, alcoholism, and drug addiction, all of which have a distinct psychological component, we know very little about the control of organic psychosis. The prevention of arteriosclerotic, certain toxic, neoplastic, and senile disorders is not yet solved. But of psychogenic conditions we are not so ignorant.

Perhaps due to faulty psychiatric education, some of our public health leaders hold that the etiological factors of these disorders are unknown, and that with no specific cause and with only empirical treatment, prevention is impossible.

Others more familiar with psychiatric findings, and who recognize a causal relation between emotional reactions and mental disease, claim that because of the magnitude of the task they

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neither know where nor how to begin, and leave the solution of a fascinating problem to time, resting it in the lap of the gods.

Those physicians who are interested enough to ask advice usually say that psychiatrists and mental hygienists offer only theory, and no tangible or practical plan for decreasing emotional disorders. In contrast, they present the definiteness in the mass prevention of diphtheria, typhoid, smallpox, and other communicable diseases.

Even though psychogenic illnesses are not controlled by an instrument such as the hypodermic needle, they are, in many respects similar to those preventable diseases on which our public and community health agencies are most centered. These disorders attack the organism at an age when it has the least resistance to external influences and offers a most fertile field for the invasion of pathological elements—during childhood. They are contact diseases, being communicated from adults to whom these weaker personalities are emotionally bound and upon whom they are utterly dependent. Unlike typhoid, but like tuberculosis, mental maladjustment is a family disease in that some adult has communicated it to the child by prolonged and repeated exposure.

The communicability of adult reactions, healthy or unhealthy, is brought about through the child's mental mechanisms, which largely determine his acquired psychic patterns, his emotional responses to stimuli, and his capacity to deal with reality.

Identification with his elders and introjection, or the inclusion of environmental factors, such as parental beliefs, prejudices, fears, ideals, and customs, are as natural processes in childhood as growth in height and weight. Children may not imitate adults in the mental content or idea, but they react to it by emotional responses. Ideational material is largely determined by the feeling tone, and by the emotions experienced during the learning process. Inherent energy is apparently transmitted through the germ cells, but the direction of its course is laid out by the intensity of the enviromental impacts. Inhibition of this instinctual force sets up a child's abnormal reactions to his parents, authority, and reality.

Unfortunately, the physiological explanation of inhibition and frustration is unknown. If we could discover the exact chemical process and precise neural reaction when normal excitations of nerves are shunted off in other directions by unnatural checkings, or if we could measure with an "emotionogram" the effect of unhealthy stimulation on the child's central and autonomic nervous systems, then mental hygiene would be willingly taken over by the medical profession and more readily incorporated in a community health plan. Lacking laboratory evidence, we have to rely on clinical findings. Up to now such experimentation has been done only on chimpanzees and other lower animals. Psychiatry has a wealth of clinical evidence that psychic patterns are laid down in childhood, and are the reactions between an organism and the objects of emotional value. This evidence has come during the past 25 years from the analysis of patients who show the mental scars of misdirected instinctual energy during childhood.

The psychoanalytic and mental hygiene findings came at about the same time and corroborate each other. The child guidance clinics have furnished ample evidence of what adults can do to a child's emotions, for when their attitude toward the child and reality changes, the child's metamorphosis occurs. Likewise, when a neurotic, or problem child, is removed from unhealthy parents and placed in a healthy

environment over a long period, alteration in personality and emotional reactions is shown. The cessation of enuresis, night terrors, tics, habit spasms, anorexia, speech disturbance, fatigue syndrome, and many other symptoms by a change in environmental stimuli, give a clue to the causation. Any preventive measures will have to be instituted with these facts in mind.

The following ideas are offered to indicate *how* a community health program can include the prevention of maladjustment and psychogenic disorders.

In the average city of 200,000 the estimated number of children will be about 110,000. The level of intelligence will not be uniform. Of these, 11,000 will be unable to complete the 6th grade in school, and 2,000 of these will be suitable for custodial care in the schools for mental defectives. Another 11,000 will be unable to go farther than the 8th grade, but can take trade training and be good mechanics. Some 66,000 will have the capacity to complete a high school course, such as college preparatory, general or commercial, and the remaining 22,000 will have the cerebral equipment to graduate from some college. The same ratio is applicable to the adult population. These figures are approximate, but they are not rough estimates. In short, 20 per cent will be of professional caliber, 60 per cent will have the ability of the tradesman, skilled artisan, and "white collar" group, and another 20 per cent will include the unskilled laborer, the farm hand, the uncomplicated-machine operator, and those who will never be able to assume financial responsibility for their children, perhaps not even for themselves.

Assuming that the city has adequate health facilities with clinics, hospitals, and a competent board of health, we advise that the mental hygiene department be an adjunct or subdivision of the health department or of a health center. Since psychiatry is a branch of medicine and only that, it is advisable to unite a psychiatric set-up with the other departments of medicine. This affiliation makes its status, function, and purpose clearer to a community. A full-time psychiatrist, social worker, and stenographer will be needed, with a yearly budget of around $15,000.

An important consideration in any community endeavor is the personalities of those serving. Adjustment to life is advantageous in all work, but in other branches of medicine ability can compensate for a multitude of personality defects. The scientist confined to his laboratory is not called upon to mix with his fellow men as much as the doctor in community activity; and the surgeon who operates skillfully can break most of the 10 commandments, yet his ability will always be valued. This is not so with the public official or with the psychiatrist in a community project. As a rule, society expects psychiatrists, like ministers, to be righteous. To measure behavior only as good or bad, rather than as healthy or unhealthy, or to view human conduct wholly from the moral aspect is a remnant of non-scientific medicine. No matter how able a psychiatrist may be, his professional scope is limited if his adjustment to social customs is not as the community would have it.

The emotional reaction of patient and doctor, the psychoanalytic transference, is one of the most valuable instruments in a physician's armamentarium, and shows up positively or negatively in every doctor-patient relation. The same emotional situation occurs in a community's attitude to those from whom it seeks help. A well adjusted staff, with minimal defense mechanisms and adequate social adaptation, integrated with the group

life, has an invaluable asset in making mental hygiene understood. Its work will then be more than "something that some doctor has started."

Approximately 3 months are needed to learn from state hospitals the number, type, and name of cases which have come from the locality during the past 5 years, and to get from the physicians as much information as they can give about the extramural cases of personality disorders—whether acute emotional episodes or chronic paranoid trends. While the psychiatrist is meeting the doctors, the social worker can seek facts from the courts and the schools about the social offenders and problem children, together with the types of offense. During this time the psychologist can correlate this information and note prevalence in families.

This preliminary survey gives the psychiatrist more than a casual acquaintance with the community and its problems, and, no less important, the community meets the staff. When any locality knows the personnel and reason for a health set-up, it is more in accord with its purpose. By understanding the nature of a mental hygiene project doctors, public officials, business men, teachers, clergy, and the general population are less on the defensive and accept it more objectively.

Offers to explain mental illness and the function of psychiatry can be made to various organizations, such as medical societies, educational groups, social agencies, church boards, men's and women's clubs, police departments, and chambers of commerce. This will be the psychiatrist's principal work during the first months. As education of society is necessary for all disease prevention, the psychiatrist will be the instructor in mental health, teaching it in the language that his audiences can understand.

A key position in a community is held by the visiting nurses and social workers. By virtue of their positions and the nature of their work, they have a close and constant contact with the family life of those who are not guided by their doctor, or who are under the supervision of social agencies, because of economic limitation or faulty social adjustment. The varying potentialities of these people can be made clearer to the workers through bimonthly group discussions and individual conferences with the psychiatrist. Thus the family constellation of those who exhibit signs of emotional abnormality and behavior difficulties is made visible. The psychiatrist can examine the parents and suggest therapy—whether it be more suitable work for the father, birth control for the mother, adequate food for the family, adjustment to a mother-in-law situation, or an acceptance of self in one's reality. It may be necessary to test the parents' mental capacity to care for their children, and permanent supervision by a family agency or public department may be needed. At least, a diagnosis and prognosis of the human material can be rendered, as is not done now with our socially dependent class.

In every preventive health activity there are always people who, because of ignorance and its companion, fear, resist any help suggested. Psychotherapy for these unfortunates is impossible until their fear is lessened by more knowledge. The region of the unknown seems dangerous to them and an instinctive self-protection is to avoid danger. The resistance to vaccination, immunization, and other health measures has been overcome only by people becoming familiar with the methods employed, through education inaugurated by health agencies and based upon proven medical facts.

Any preventive work is first adopted by the educated and higher social order of a community. In this group are

the doctors. Society naturally looks to the medical profession for help and information on health. Therefore, a requisite for the prevention of mental illness is that the local physicians know the possibilities and limitations of psychiatry, both in therapy and prevention. This is best accomplished by employing it on cases. A share of the psychiatrist's time—paid for out of community funds—can profitably be allotted to consultation work with other physicians. A psychiatrist, by presenting an occasional and instructive paper at the medical meetings, working *jointly with family doctors and other* specialists, and being interested and coöperative in all health problems, can help to bridge the gap between physiological and psychological reactions. In this way the body-mindedness of our medical thinking will be outgrown, and the physicians can understand the psychiatry that the medical schools failed to teach them. With this knowledge their contribution toward the prevention of maladjustment is unlimited. The patient will not only benefit by therapy, but, equally important, the physician will be better equipped to recognize and control the causative factors in children.

In the prevention of children's diseases much of the doctor's work is accomplished indirectly through the parents, while in our schools the child is met directly. Our educational system is primarily for the pupils enrolled, but often parents learn ventilation and health rules from what the child has grasped in school. Sometimes he, particularly the adolescent, is put in a conflicting position by his parents not agreeing with the teachers.

For this reason the child must feel secure with his instructors and gain some satisfaction from his school accomplishments. Many an emotional conflict produced in the home by rejection, domination, or over-protection, has been lessened by a feeling of safety with his teacher, of belonging to a social group, and of being trusted by the educators with whom he identifies himself. Education, or the development of potentialities, is not accomplished by inhibiting the child's capacities or by expecting him to achieve more than he can. Fitting a child for life is brought about by taking direct account of the organism's ability, and not of the parental hopes and wishes, or the moralist's will power.

To this end the psychiatrist can meet informally with the faculties and give *them a better understanding of the* biological make-up of the total individual, mentioning facts to illustrate that laziness, restlessness, and lack of concentration are not answered by heredity, perversion, or the devil. The conferences can be stimulating and helpful, especially if they are not obligatory.

Following a clearer grasp of maladjustment, vocational planning can be introduced in one school and gradually extended to others. Vocational adjustment takes into account the scientific fact that all men are not created equal in capacities or in opportunities to develop their inherent potentialities. It is a means of having fewer educational misfits, decreasing the rapid turnover in factory, shop, and office, and lessening dissatisfaction in our social structure, with its new political platforms and unrealizable promises every 4 years. Increased knowledge alone shows us the futility and waste of trying to fit a square peg into a round hole. To direct the boys and girls leaving school so that their occupations will be consistent with their intelligence, emotional make-up, physical capacity, and social status, will contribute to the reduction of mental and social conflicts, and it can be done.

The final word of psychological testing has not been said, but the tests

have proved to be as positive measurements of that unknown quality called intelligence as the clinical thermometer is in indicating the severity of disease. The psychologist can sort, in the 8th grade, the simple factory type from those whose ability permits of further schooling. The children with superior ratings on group tests can be advised to enter high school, and the parents who object because of financial or other reasons can be referred to the family physician, the psychiatrist, or a social agency for an explanation of the findings. The choice of further education can be left to the child, with whom it belongs, without family interference—which does not often happen.

Those with low ratings on the group tests can be given manual dexterity and other individual tests to explain the lower score. As the years pass, the test intelligence of the adolescent and young adult group will be on record for future work reference. This and other psychiatric findings can be added to any information necessary for working papers. The clinic or the board of health can act as an employment center where employers can apply and learn of the prospective employees' fitness.

This will be a beginning of psychiatry in industry. A plan of this kind will decrease the frequency of youth attempting wholly unsuitable work with its consequent emotional reaction, and will help them to find gratification in work they can do, which, in turn, is one of the simplest and surest ways of handling the embryonic gangster.

The majority of our adolescent population will be in the various types of high schools, where health education, both for the students and the young parents, can be centered. The psychiatrist can join with other physicians in giving simple talks to parents and pupils, and mental hygiene can readily be incorporated in general health education. The potential parent of the next generation will profit from health instruction, the meaning of parenthood will be better understood, and the ignorance about human behavior and so-called insanity will be decreased.

When requests are made for literature or books, the staff can have available the information suitable to the person's intellectual and educational level, and if the demand warrants it, pamphlets explaining mental health and illness in simple language can be had. Gradually, information on faulty mechanisms, anti-social conduct, purposeless behavior and destructive inhibitions will be as general as is now the understanding of the advantage of milk in one's diet.

In 1930 the Bellevue-Yorkville Health Demonstration instituted an educational program for the nurses associated with the center. The psychiatrist gave only 2 mornings a week to the work, but that time was spent mostly in discussions with the entire group and in individual conferences on the work with the cases. Anyone outside of the staff was welcome to these group meetings, and there was usually some visitor, perhaps a doctor, a social worker, a priest, or a graduate student in some college. After 2 years of work we reported the results at the meeting of this organization in Washington. The program was continued until January, 1934, at which time the city health department assumed the entire financial obligation of the center, and the Mental Hygiene Department, which had been supported from private funds, was discontinued. Gathered from the opinions of the nurses, the teachers, and the families met, together with the results in the other clinics, it can be said that the plan was concrete, workable, and contributory to the lessening of psychogenic and social difficulties.

The lack of community programs for the prevention of mental disorders is not wholly due to the reasons offered by our public health leaders, such as the nonspecific causation and intangible methods, but rather to the same reason that prevents mass prevention programs for venereal diseases, which are of specific etiology and for which the preventive measures are definite and known. Program after program can be laid down, but none will be accepted, no matter how concrete, so long as our leaders think subjectively about the wickedness of sexual instincts and cling to the moralistic idea about the sinfulness of antisocial behavior. Only by education was the somewhat disgraceful term, "pulmonary tuberculosis," substituted for the less innocuous "lung fever." Society accepts some medical facts gingerly but it eventually follows the leadership of the profession. Progress is made after health agencies, public and private, appraise any disease objectively and scientifically. It is brought about by constant mass education, which, like all development, is gradual and questioned. Resistances are always encountered when science uproots our primitive beliefs and lays bare our emotional defenses.

Psychiatry offers no panacea for life's frustrations but looks for the explanation of human behavior as diligently as other specialties search for the meaning of man's less total functions.

The prevention of abnormal behavior is an educational and scientific procedure. It is not peace propaganda, it is not a political campaign, it is not related to capital or labor, it has no reference to any church, it is not a social entertainment.

This procedure coördinates medical knowledge and keeps in mind the totality of the individual. It deals with the imbalance of physiological processes brought about by tissue destruction or emotional conflict. It takes into account the instinctual energy misused and uncontrolled because of grandular disturbance, dietary deficiency, or cellular change; it also works with histologically normal organs *functioning pathologically* as a result of emotional response to parental reactions and environmental influences. It aims toward a sound mind in a sound body.

DISCUSSION

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THIS paper makes the following specific allegations:

1. There is a steady increase of mental disorders, a class of diseases which are almost as endemic as the common cold and about which the causations are as definite.
2. No community has inaugurated as yet a specific and continuous plan for their prevention.
3. The medical profession and boards of health do not yet accept that the prevention of mental and emotional disorders falls within their province.
4. We know very little about the control of organic psychosis but we do know about the control of psychogenic conditions.
5. Due to faulty training, some physicians and public health administrators hold that the etiological factors of psychogenic mental diseases are unknown—therefore not preventable.
6. Some physicians and public health leaders recognize a causal relation between emotional reactions and mental diseases but because of the magnitude of the task do not see any place to begin.
7. Most physicians and public health leaders claim that psychiatrists and mental hygienists offer only theory and no tangible or practical plan for decreasing emotional disorders.

These allegations can, we believe, be proved beyond a reasonable doubt. The last 3 relative to the physician and public health worker may be the fault of the psychiatrists themselves. Psychologists and psychiatrists have spent a major portion of their efforts on the promulgation of theories that mystify the profession as well as the public. They have surely shirked their duty in not pausing long enough to test, prove, and formulate some fundamentals upon which they could all agree. These fundamentals would then be given general scientific approval and serve as the foundation of their specialty and the education of the uninitiated.

The president of one of our large midwest universities recently made a study of his department of psychology. He found that his 6 professors of beginning psychology were each using a different text. The 6 texts were each written to establish the theories of 6 different schools. He called his staff together and asked them if there were not a set of fundamental principles upon which all psychologists could agree. The staff thought that there was. He told them to get together and bring to the next staff meeting a text which incorporated these elementary fundamentals upon which all could agree. Each professor brought the same text he had been using. The president took the position that he did not care what theories or what school of psychology they taught in their advanced classes but all must teach the same text in the elementary courses, and that text must contain the fundamental principles of psychology upon which all psychologists could agree. He asserted that the student had a right to such a text and such an initiation into the field of psychology, before he was asked to grope about and try to keep his sanity in the entanglements of psychological theories. After much discussion with the president, the majority decided upon such a text. Two, however, said they could not teach this text and were excused from teaching the beginning classes.

Physicians and public health leaders have a right to expect that the psychiatrists clarify their field and give some attention to recognized fundamentals upon which a scientific understanding and procedure can be built. Then and only then is it justifiable to make such allegations as the above against the medical profession and public health workers.

Therefore, Dr. Adamson performs a unique service. In so far as is possible in a short paper she states the fundamental points relative to prevention. These principles are simply stated and are agreed upon by all mental hygienists — namely, that psychogenic illness is mainly acquired in childhood; that it is a family disease in the same sense that tuberculosis is, in that some adult has communicated it to the child by prolonged and repeated exposure during a period of weak resistance; that with the understanding that psychic patterns are laid down in childhood, the prevention of psychogenic diseases becomes a problem of leadership and guidance on the part of psychiatrists in the schools and home.

This clarifies the problem, defines the scope of activity, and outlines the point of attack in so far as the responsibility of the public health administrator is concerned. It is at least as clear, and is better defined than our tuberculosis problem was when we began our program of prevention.

With the foregoing allegations and conclusions, the paper proceeds to outline a community health program in the prevention of maladjustments and psychogenic diseases. The plan has the following merits:

1. It is essentially a broad educational program.
2. Its activities correlate the medical profession, the schools, and the home.
3. It is directed by the psychiatrist.
4. It is supervised by the public health department.

This plan of organization clothes the movement with the educational and scientific safeguards essential to its success.

In any new movement, if the highly emotional types are given any opportunity, they do the cause more harm than the conservative element. These well meaning individuals become militant missionaries with a new cure for all human problems. They create illogical and non-scientific ideas and procedures as short cuts to the performance of their miracles. This element has already been a detriment to psychiatry. The phrase prevalent from Maine to California "Have you been psyched?" has in its implications disgusted not only the medical profession but most of the stable population. The plan of organization recommended safeguards the program from such pitfalls.

Any medical educational program not supervised by the medical profession and given the stability of the administration of the public health organization sooner or later runs amuck. It has a period of emotional, hysterical propaganda with wide publicity culminating *in quasi* and pseudoscientific principles and procedure. Sooner or later the public senses the facts, discovers the pseudoscientific principles and goes to the opposite extreme of negative reaction to the whole program. The mental hygiene and mental testing programs of our public schools are even now in such danger.

There is some public demand for the public benefit of psychiatry at public expense. It is interesting to note from news items the various avenues this demand takes. For instance, here is one from the *Akron Times Press*, August 29, 1935: "The Young Men's Democratic Club after hearing a talk by Probate Judge Dean F. May, yesterday adopted a resolution urging the county commissioners to appropriate $15,000 for a mental clinic at the County Home. The club met at the Y.M.C.A. A committee was named to confer with the commissioners."

We can assume then that the following allegations are true, and correct beyond a reasonable doubt.

1. The steady increase of mental disorders is a menace to the health and happiness of the American people.
2. Psychiatrists are agreed upon the essential fundamentals in the etiology and prevention of psychogenic mental disorders.
3. They have established well defined and scientific procedure in diagnosis and clinical treatment.
4. Psychiatry is a branch of medicine.
5. There is public demand for the humane, social, and civic benefits that psychiatry has to offer.

If this be true, then the medical profession cannot be true to its history and tradition if it shirks the leadership and scientific guidance of this phase of medicine, and its administration through the public health organization.

Consumer Demand for Vital Statistics*

The Health Officer's Point of View

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THE title of this paper might well have been put in the form of a question, namely, "What use does the health officer have for vital statistics?"

During the past 15 years, while health departments, particularly state health departments, have been expanding rapidly their field of activities, many people are apt to lose sight of the fact that the science of public health was founded and still rests firmly upon vital statistics. There is no branch of public health work the founding of which was not either wholly or at least in part the result of a study of vital statistics.

The so-called "Sanitary Awakening" occurred about the middle of the 19th century. The first medical officer of health in England was appointed in 1847 by the Town Council of Liverpool. In October, 1848, the Corporation of the City of London appointed as its Medical Officer of Health, John Simon, then a young lecturer in pathology at Kings College. John Simon was the prototype of our modern health officer, the first health officer in the modern sense.

Where did Simon get his information regarding the conditions prevailing at the moment and upon what information did he base his acts as medical health officer? From Simon's book on English Sanitary Institutions we find that the death returns of the city registrars were made on Monday mornings and on Monday afternoons they were placed at his disposal, as he says, "in a way which enabled me to complete my use of them during the evening, so that on Tuesday mornings when the weekly courts of the City Commission were held, I was ready with all needful particulars as to the deaths which had befallen the city population during the previous week, and with my scheme of such local inquiries as were to be made in consequence."

From the above quotation we see that the weekly bills of mortality formed the basis for the investigations which he instituted as to the causes and means of prevention of deaths among the inhabitants of London. For John Simon, vital statistics formed the corner-stone of his work.

The 88 years that have elapsed since Simon took office have seen the development of practically all those sciences, such as bacteriology, epidemiology, parasitology, pathology, immunology, sanitary engineering, etc., upon which is based the modern science of preventive medicine and public health. Sources and modes of obtaining information have been multiplied, and yet returns of deaths still form one of the most important sources of information to health officers. All the

* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 10, 1935.

other intelligence services used in modern public health practice cannot replace the death returns. The standard form now in use in, I believe, all but one of our 48 states contains a mass of information impossible to duplicate by any and all other practical means and supplies the health officers with a great many facts from the practical viewpoint which are unobtainable from other sources.

For certain diseases such as diphtheria, typhoid, and a few others, morbidity reports are quite dependable and reach the health officers in advance of mortality data, but for many other diseases which are public health problems and which in certain parts of the country are more prevalent than diphtheria or typhoid, our only reliable source of information is through the returns of death. It is true that death returns do not give the health officer all the information he desires or needs, but when the medical profession does not report the prevalence of certain diseases with any degree of dependability, the health officer must rely to a great extent upon death returns. To cite only one disease, consider tuberculosis. Previous to 1930 in Rhode Island more deaths occurred from this disease than there were cases reported. I have not attempted to compare corresponding figures in other states. The same condition has in the past prevailed in the other states and if we took the time to inquire, we would probably find it still existing in at least some of our states. Under such conditions we can get but a very poor picture of the situation as regards tuberculosis from the public health standpoint from any source other than the death returns.

I do not wish to create the impression that I am in any way minimizing the importance of morbidity reporting. As a matter of fact, from the health officer's point of view I regard morbidity reports as an integral part of vital statistics. Our vital statistics will never reach that degree of completeness which every conscientious health officer desires until morbidity reports become as complete and accurate as mortality reports. Mortality reports give a two-dimensional picture. The addition of complete morbidity reports to our mortality statistics give the health officer a three-dimensional, stereoscopic picture. The perspective thus created helps to place many objects in the picture in a much more accurate relationship to each other and will help to remove much of the distortion which now affects the picture, particularly if the health office is affected with cerebral myopia.

The health officer is also interested in birth returns, for these statistics constitute the common denominator for the study of all the factors concerned in infant mortality. Our knowledge of infant mortality and our studies of all the factors contributing to infant deaths and the saving of infant lives are vitiated to just the extent to which our records of births are inaccurate.

It is the health officer's duty to determine the size of the public health problems confronting his state, city, or community. It is his duty to ascertain as accurately as possible the progress that is being made in the numerous activities carried on by all up-to-date health departments. He is looking for every reliable criterion for determination of conditions and evaluation of the degree of progress. If there are any faults in his various programs he wants to know where these faults are at the earliest possible moment in order that he may rechart his course and reset his sails for a more direct attack. Even though the advances in public health practice have added other measuring sticks, in all these problems the health officer always has been and always will be dependent to a large extent upon this study of mortality statistics. Mor-

tality statistics are one measuring device with which a health officer cannot dispense. The solution of many of our unsolved public health problems lies in the collection of better and more accurate vital statistics and in the greater study and more accurate interpretation of the vital statistics we already possess.

Mortality statistics was the foundation upon which John Simon founded the modern public health movement. During the 88 years since John Simon began his work vital statistics have lost little if any of their importance. Whatever superstructures have been erected in the past or may be erected in the future, such superstructures will always rest firmly upon a foundation of which vital statistics is an integral part.

Consumer Demand for Vital Statistics*

The Needs of the Epidemiologist

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DEMARCATION of the field of epidemiology is becoming more difficult due to a tendency to apply the term not only to infectious diseases, whether or not they occur in epidemics, but also to certain diseases considered to be non-infectious, such as diabetes and cancer. Also it has been applied, correctly, to experimental studies relating to virulence, means of transfer, or resistance. For the purpose of the present discussion, however, it will be understood to denote only the natural phenomena, or natural history, of pathological conditions known to be of infectious origin.

Whipple distinguishes between vital facts, which concern birth, marriage, divorce, sickness and death, and vital statistics, which is the application of the statistical method to the study of these facts. Commonly, however, the terms "vital statistics" and "vital facts" are used more or less synonymously. It will be assumed that the present discussion is concerned with the demand for vital facts, properly collected, collated, and tabulated.

In general, the work of the epidemiologist is twofold. He is the "watchman in the tower" equipped to investigate and take immediate action whenever undue prevalence becomes manifest. Between such events, the intervals comprising most of his time, he is engaged in the study of endemic disease, that is, in research of a fundamental nature such as the determining of sources of infection, methods of spread, or other characteristics; or his efforts may be directed more immediately toward better methods of prophylaxis, as in the study of the efficacy of some immunizing agent.

In his primary function, the epidemiologist depends on vital statistics, upon records of previous and current morbidity and mortality, to initiate his activity. Many small outbreaks are overlooked and large ones not recognized in their early stages, for lack of

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such records, or failure to utilize them. Case fatality rates have some value in checking completeness of reporting, and should be computed, for the principal diseases, month by month, at least for counties and large cities. Sufficient statistics are now available in most large cities and in many counties to provide fairly satisfactory weekly norms for a few diseases. For this purpose median incidence should be computed, using, for example, the method of Bundesen and Hedrich.

It should be recognized that the degree of completeness of reporting which can be hoped for under the best system of registration will vary with the disease and with its severity. In smallpox, for example, the number of cases reported when a virulent form is present should not be far short of actual prevalence; during mild epidemics a certain proportion will be overlooked. The same general fact is true of diphtheria, scarlet fever, and other diseases; that is, the milder the type the larger the proportion of missed cases.

In research problems, vital statistics are the *sine qua non* of the epidemiologist. Population estimates by color, sex, and age, are in constant demand, and without these other statistics are of little value. On several occasions, it has been necessary for the writer to take a population census preliminary to epidemiological studies, due to the lack of reliable estimates in sufficient detail. This was true of a section of Baltimore some years ago in a study to determine the value of toxin-antitoxin. Also, a block census of Knoxville was made by Dr. Haygood and the writer in studies on typhoid fever. In the first of these instances the count would not have been necessary had it not been for the delay in publication of the federal census. In the second, the city had grown so rapidly as to render quite uncertain estimates based upon a census taken 6 or 7 years prior.

When working in foreign countries, particularly in the Orient, the need for population data is far more acute. In many large areas, no reliable census has ever been taken. Even in the Philippine Islands, there has been no census since 1918, and none prior to this since the American occupation, save the military census of 1905.

In generalizing upon the research of the field epidemiologist it should be noted that many of our most important facts and conceptions relating to infectious diseases still rest solely or chiefly upon evidence obtained in the field. Among these are:

1. The infectious nature and communicability of certain diseases, the etiological agents of which have not yet been discovered.

2. The immunity resulting from an attack of certain common diseases. Perhaps the classical example of this is the proof of immunity conferred by an attack of measles, established by Panum in his study in the Färoe Islands in 1846. Panum was able also to determine other important facts, including the usual period of incubation of this disease.

3. Definite and characteristic differences between diseases with respect to season, age distribution, geographical distribution, and periodicity.

4. The transmission of certain diseases by inanimate objects or by food. A classical example again may be cited, namely, the transmission of cholera by polluted drinking water. Although the name of John Snow is connected most intimately with the Broad Street Pump epidemic, his brilliant statistical analysis of data relating to the cholera deaths in London in 1854 furnished incontrovertible proof of the relationship of these deaths to drinking water. In the appendix to his classical work there is given a list of the names and addresses of fatal cases which he secured from the Registrar General; and also the name of the water company supplying the house. His account is the record of an experiment, set up unwittingly but almost ideally, by commercial water companies; and, as Snow expresses it, "The experiment, too, was on the grandest scale. No fewer than 300,000 people of both sexes, of every age and occupation, and of every rank and

station, from gentlefolks down to the very poor, were divided into two groups without their choice, and, in most cases, without their knowledge; one group being supplied with water containing the sewage of London, and, amongst it, whatever might have come from the cholera patients, the other group having water quite free from such impurity." This is one of the first and most notable contributions of vital statistics to epidemiology.

5. The relative importance of various modes of transmission as actual factors in disease prevalence.

6. The particular conditions responsible for local prevalence whether epidemic or endemic.

Without further expansion, it will be obvious that establishment of these and other facts would be impossible without statistics of population, morbidity and mortality; first, broad statistics which it is the duty of the vital statistician to improve and extend and, second, more detailed statistics which the epidemiologist must collect for himself.

No manipulation of vital statistics can solve the fundamental problem of the cause of epidemics. Mathematically, the usual type of epidemic curve can be reproduced on several essentially different hypotheses; assuming, for example, as did Brownlee, variation in the pathogen, or, as did Ross, variation in other factors. The solution must be sought in the experimental laboratory.

Similarly, no statistician can forecast from a study of previous morbidity and mortality, precisely when an epidemic is to be expected. In influenza, Brownlee was of opinion that there exists more or less regular periodicity, but he recognized fully the inadequacy of available data. In this connection, as in many other problems, it is necessary to think of the future. Only the foundations of vital statistics have yet been laid, even in the most advanced areas. The vital statistician is, therefore, still a pioneer. Upon the success of his efforts to intensify and expand his field, the future of many related sciences, and among them epidemiology, will, to a large extent, depend.

Consumer Demand for Vital Statistics*

The Need of the Child Hygienist

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RECENTLY, as I have had occasion to look over some early reports of annual meetings of the American Association for the Study and Prevention of Infant Mortality, and also the report of the first Conference on the Prevention of Infant Mortality held in 1909 under the auspices of the American Academy of Medicine, I have been impressed with the almost universal demand on the part of the pediatricians, obstetricians, social workers, statisticians, and others who took part in the meetings for more exact and more extensive data on infant mortality. Though previous to the beginning of the 20th century there had been a general awareness of the great number of infant deaths, it was not until the first decade of this century that the in-

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terest of professional workers in the United States was aroused and concerted action initiated to make available the statistical information which was necessary to stimulate community action for the prevention of infant mortality and the improvement of health conditions among infants and children.

Up to the time of this first conference in 1909, data on infant mortality had been limited to the reports of infant deaths collected in connection with the decennial censuses of 1880, 1890, and 1900, and to reports of infant deaths for a few states and a few large cities. In the law of 1902 authorizing the Bureau of the Census to collect mortality statistics annually, the annual collection of birth statistics was also authorized.

The need for registration of births and the importance of reliable infant mortality statistics based on live births were discussed in the Census reports in 1906; in 1907 the report pointed out that there was no state or city in the United States which had even fairly complete registration of births; in 1909 the need of reliable statistics for the provisional birth registration area and, indeed, for the whole of the United States was reiterated. It was not until 1915, however, when 10 states and the District of Columbia had sufficiently complete registration of births, that the birth registration area was permanently established. Since that time, data of increasing importance to the child hygienist have become available, and today, 20 years later, we have in our infant mortality rates an index for measuring accomplishments in the child health field that is invaluable.

Close upon the heels of this rapidly developing interest in the prevention of infant deaths came similar demands for prevention of maternal deaths, for more accurate and complete reporting of these deaths, and for a better understanding of their causes. Since the accuracy of maternal mortality rates also depends upon the completeness of birth registration, increased impetus was given to the campaign to establish the birth registration area. Furthermore, the close association of prenatal and natal conditions in the mother with the welfare of the new-born infant was obvious, and obstetricians and pediatricians alike were drawn into the activities of the growing child hygiene program.

That vital statistics must be an essential part of the stock in trade of all who are engaged in improving maternal and child health conditions, whether physicians, public health nurses, social workers, nutritionists, or others, needs scarcely to be pointed out. The child hygienist knows, for instance, that the trend of infant mortality rates in his community will be used as one of the measuring rods of the success of his program and that he must be alert to see that the data are as accurate as possible. He knows, too, that one of the most important uses of vital statistics is to interest his public in extending and broadening his program. To do this he must present the data in a form that is graphic and easily understood. Maps and diagrams are of the greatest value for this purpose and will often be more effective than words in educating the public. More material of this sort, giving information on local communities as well as individual states and the United States as a whole, is needed.

The most important use of vital statistics to be made by the child hygienist, however, is in connection with the formulation of his community program. Decisions with regard to the type of service most needed in certain districts or even for the whole area under his jurisdiction may depend to a great extent on the facts brought out by a study of statistical data.

Selection of areas for special investigations, for demonstrations, or for other types of intensive work will depend on the infant or maternal mortality rates or on the rates for communicable diseases or on other morbidity data.

At the present time, when state health departments are planning programs for strengthening their maternal and child health services with funds to be allotted under the Social Security Act, statistics on live- and stillbirths and on infant and maternal deaths are indispensable. The act itself requires that certain allotments of funds be made on the basis of live births, and in deciding how additional allotments will be made from the fund to be distributed on the basis of financial need of the state for assistance in carrying out its plan, not only will live births be taken into consideration but also the need, as shown by infant and maternal mortality rates, and by morbidity as well as mortality rates for diphtheria, tuberculosis, dysentery, and so forth. The use of live births as a basis for allotment of funds is a new procedure which was made possible by the inclusion in 1933 of the last of the 48 states in the birth registration area. Fair and equitable allotment of funds, however, requires that the reporting of data should be equally complete in all states. The birth registration campaigns recently conducted jointly in 24 states by the U. S. Bureau of the Census and the F.E.R.A. have stimulated interest in more complete reporting of births and deaths, and it is hoped that similar campaigns will be conducted in other states in the near future.

Adequate information on which to base the preparation of state programs for maternal and child health services must include not only mortality figures for each state as a whole and for its urban and rural areas by color, age at death, and cause of death, but also detailed statements with regard to the situation in individual communities. Such statements have been prepared from local statistical data in many places for local use. Information on infant mortality rates by counties for the period 1930 to 1932 for the whole of the United States with the exception of Texas is now available in map form, and similar data on maternal mortality by counties for the period 1931–1934 are being compiled by the Children's Bureau in coöperation with the Bureau of the Census. Plans are also under way in the Bureau of the Census for the reporting of mortality data by residence for the country as a whole.

The mortality statistics available are on the whole reasonably satisfactory for the purpose of planning programs or will be when the data on maternal mortality by counties and mortality by residence are available. There are, however, additional data that would be of value to the child hygienist if they could be obtained. There are at present no nation-wide or state-wide data on the relation of infant or maternal mortality to such socio-economic factors as unemployment, family income, and change in economic status, nor with regard to the relation of maternal health to the health of the infant. Had such data been available during the past 5 years, many of the questions in the minds of child hygienists, social workers, and others as to the effect of the economic depression on infant and child health and welfare would have been more easily and more satisfactorily answered. If such data could be made available on a nation-wide basis, added impetus would be given to the whole child health and welfare movement, and the child hygienist would be in a still better position for the organization of activities.

An aspect of vital statistics long neglected and yet of great importance to the child hygienist is the record of

stillbirths. The causes of stillbirth as entered on the certificates are so unsatisfactory and the terms used so poorly defined that it is impossible to learn much about the fundamental conditions that led to the death of the fetus. To study adequately the causes of stillbirths with a view to ultimate reduction in their number, the child hygienist needs not only accurate and comparable information with regard to the items on the present certificate, but more information in regard to conditions in the mother that preceded the death of the fetus. The revised stillbirth certificate suggested by the American Public Health Association's Sub-committee on Accuracy of Certified Causes of Death would provide much of the needed information, and should stimulate interest in the search for causes. Furthermore, completeness of stillbirth registration and uniformity of state laws with regard to minimum period of utero-gestation for which registration of stillbirths is required are of fundamental importance for the reduction of fetal and maternal mortality. Information regarding all stillbirths from the 5th month of gestation onward should be recorded.

An excellent opportunity for improvement in the completeness of stillbirth registration exists in connection with birth registration campaigns. This opportunity should be taken advantage of in the campaigns conducted in the future.

Further information is also needed regarding the prenatal and natal circumstances that precede the death of live born infants, especially those taking place on the first day of life or within the first week. Though prematurity is given as the cause of death in more than half of all neonatal deaths, it is impossible to determine from the birth or death certificates the underlying condition in the mother that led to the premature delivery and was the real cause of the death of the infant. Space should be provided on both birth and death certificates for the entry of information regarding prenatal and natal conditions so that data may be available for infants who survive as well as for those who die.

Revision of the titles under which causes of deaths that occur in the first year of life are classified in the *International List* is greatly needed, especially of the titles that are used frequently for causes of death in the neonatal period. Titles such as congenital debility, which do not describe a medical entity, should be deleted and more titles that are medical entities be substituted for indefinite terms. I appreciate that the difficulty or impossibility of making a diagnosis often accounts for the entry of indefinite terms on death certificates. Complete entry of conditions found in the child would, however, often provide the information not now available for classification of cause of death under titles which would be actual medical entities.

With respect to reporting of maternal deaths, space should be provided on the death certificate for more detail as to cause of death and definite inquiries should be included regarding the prenatal and natal conditions regarding all deaths associated with pregnancy and childbirth. Statistical information is greatly needed with respect to all deaths associated with pregnancy and childbirth and not just those that are assigned to the puerperal state.

To the child hygienist vital statistics are perhaps more important in planning and developing his community program than any other group of facts at his disposal. More use should be made of them, especially in graphic forms, and more data should be gathered and made available to child hygienists and others which will throw further light on the major problems in the field of maternal and child health.

Consumer Demand for Vital Statistics*

The Health Education View

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AT the outset I can testify from many years of experience that there is a considerable demand for vital statistics and it is a demand we should endeavor to meet. But just as any wise manufacturer seeks always to adapt his product to the consumer by studying his market, so should we study the consumer demand and adapt our vital statistics accordingly.

It seems not sufficiently realized that our consumer demand comes from three distinct groups and that each of these requires vital statistics of a special kind. Failure to take this fact into account is largely responsible for the mediocre, uninteresting, and worthless bulletins published by many health departments throughout the country.

First of all, then, let us have clearly in mind the three broad groups of consumers for whom we should prepare vital statistics. They are—practising physicians, students of public health, and the laity.

PRACTISING PHYSICIANS

Let us take them up in order. I have listed the practising physicians first because I regard this group as the one to which health departments should devote their first attention. I have repeatedly expressed the opinion that if a health department can publish only one bulletin, it should be a bulletin addressed primarily to physicians and students of public health. In such a bulletin, vital statistics lend themselves admirably to the presentation of current health problems. They can be utilized to call the attention of physicians to the prevalence of disease, to interesting correlations with which the physicians should be acquainted, and to problems which deserve investigation. I have found them very useful as a point of departure for an informative article on some important phase of public health.

Vital statistics for the purposes just mentioned should be simple, and, as far as possible, illustrated by simple graphs. They should be free from such mathematical refinements as "probable error," "standard deviation," or "correlation coefficient." The tables should be stripped of unnecessary details, and each article should be limited to the presentation of one or two simple facts readily grasped by the reader.

Practising physicians welcome this type of information and are influenced by it. They accept the data and conclusions on the authority of the department of health or other health agency sponsoring the publication.

STUDENTS OF PUBLIC HEALTH

We now come to quite a different consumer group from that just discussed. Students of public health—

* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 10, 1935.

and under this I include, of course, health administrators—want detailed basic facts. They do not shy at long, dry-looking tables, for they have learned how to extract the nuggets often present in a lot of mere figures. These consumers must have all the available data, must be informed of all the exceptions or inclusions in the tables, all the qualifications.

In a health department bulletin or annual report it is advisable to publish only the detailed basic tables, leaving the publication of scientific analytic studies to special articles in scientific journals.

While the number of those who demand detailed statistical tables is relatively small, they constitute an important and influential part of our consumer group. They should not be overlooked.

THE LAITY

So far as the laity is concerned, its demand for vital statistics comes to us chiefly from the newspapers. Judging by what the city editors ask for when they send their reporters for information, there must be a considerable interest on the part of newspaper readers in vital statistics. Inasmuch as my experience is with the large metropolitan dailies, in which space is very valuable, and inasmuch as the city editors of these newspapers have a keen instinct for what the readers want, this attitude on the part of the editors is significant.

Now just what kind of statistics do the newspapers prefer? Well, for one thing, they all want weekly, a statement of the number of births and deaths. It is advantageous to furnish with this, comparative figures for the preceding week, and cumulative totals for the year and for the corresponding period of the previous year. Besides this, in New York City we furnish figures for a few important causes of death and figures on infant mortality.

From time to time depending on local conditions, some special topic can be treated statistically—the course of a disease over a period of years, the course of deaths from automobile accidents, from suicide, from typhoid fever and the like. Birth statistics always appear to be specially welcome—total births, number of twins and triplets, births by nationality of mother, by age of mother, largest number of births to a mother, youngest mother, etc.

Statistics supplied to newspapers should be extremely simple. The tables should usually be narrow, to fit readily into a single column. On the relatively rare occasions when it is possible to secure extended space for a special feature article, a neat graph can often be used advantageously.

Many of the routine press releases dealing with the health department activities can include statistical data. In this connection, it is well to remember that numbers are more readily understood than rates. If the point can be made by using actual numbers in place of rates, the numbers should be preferred. If rates must be used one should be careful as to the mode of expression. Health officials are so accustomed to the use of rates that they easily forget to write out in full, "per 100,000 of population," or "per 1,000 babies born."

Newspaper statistics should always be timely and as up-to-date as possible. If a particular analysis relates to statistics a year or so old, they may often find prompt acceptance if the introductory statement says: "According to a survey just completed by ...." Naturally, in every case, the material must stand on its own merits; it must have public interest.

In order to secure full use of vital statistics by the newspapers it is important to learn just what constitutes news. There is no better way to do

this than by establishing a friendly contact with some of the local editors, or, in a large city, with some experienced reporters. Discuss matters with them and endeavor to supply sound statistical material along the lines they suggest. However, keep your feet on the ground and do not yield to mere sensationalism.

Is there a consumer demand for vital statistics?

Most emphatically yes!

Consumer Demand for Vital Statistics*

The Field of Demography

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THE interest of the demographer in vital statistics is somewhat less specialized than that of the person engaged in public health work and much less specialized than that of persons engaged in particular fields of public health. The demographer is interested in all the movements of population and in all the factors which are likely to affect these movements, hence, he is anxious to see the best possible all-round collection and tabulation of births, deaths, and marriages. These form a considerable part of the grist for his mill, and naturally he wants the basic materials to be satisfactory. Complete and accurate registration of all *vital* facts is therefore a basic need of the demographer. He must perforce work with less but in so doing his results are vitiated to a certain degree.

One use to which the demographer can put vital statistics is in the forecasting of population growth and changes. In a world in which any planning for the future is done by the community it is essential that population trends be kept track of and that fairly reasonable estimates of growth (or decline) be made. The usefulness of such estimates naturally depends in large measure upon their accuracy, and it goes without saying that this must vary more or less directly with the accuracy of registration of vital facts. I say this because I believe it is now fairly well recognized that there is no *law* of population development by which population growth can be predicted, regardless of the actual vital trends. Again, without accurate death registration we cannot calculate accurate death rates by age, and without these we cannot construct life tables. Also without these age specific rates we cannot calculate the age composition of the future population within limits which will render such calculations of greatest value in planning for old age pensions, for school plants, or for many other enterprises which the community may desire to undertake.

Complete birth registration is just as important as death registration to the demographer. Without this we cannot know the balance of births and deaths and the general trend of population growth. Also without tabulation of births in connection with various factors of population composition, *e.g.*,

* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 10, 1935.

age, nativity, race, social status, etc., we can only partially know the differences in birth rates between social and regional groups. It is of great importance to know that region A is increasing from an excess of births over deaths faster than region B, or that group X is contributing more to the next generation than group Y. From such data we can hope to learn not only what the differences in the birth rates of different communities are but also what are the factors which control the birth rate. Such information will be extremely useful if ever the community sees fit to venture upon a rational control of population growth. A full knowledge of the differential birth rate is important both because there are differences in the hereditary quality of different groups and also because the educational and social differences between groups of our population may give direction to future social development. It is not surprising, then, that the demographer wants to know the general economic and social background of all children born and of all persons dying. It is important to him to know not only that farmers generally have larger families than lawyers, doctors, and other professional people, but also how much larger these families are, and whether there are significant regional differences. Furthermore he needs to know whether laborers have higher specific death rates than teachers or skilled mechanics, and if so how much higher these rates are. Clearly nothing like an adequate inventory of population movements is possible without very accurate and detailed birth and death registration.

Again, it is important to the demographer to know the age of all mothers giving birth to children, by their nativity and their race. Nor is it sufficient to give merely native born, foreign born, and Negro mothers, nor to lump together Mexicans, Indians, Chinese, Japanese, and Negroes under the rubric "colored." Likewise it is necessary to know the occupation of the head of the family if we are to get any satisfactory notion of the relative rates of increase in different social classes and of the differences in death rates between these classes; and all this information should be available for all sizes of communities. It would be a fine thing, too, if the census classification of occupations and the vital statistics classification could be so related that accurate birth and death rates for different occupational groups could be calculated.

Furthermore the demographer would like to be able to calculate the death rates from the more important causes of death for particular communities, since without such rates he cannot very well understand the differences in their population movements. At present he can do little in this field because of the failure to allocate deaths to usual place of residence for different sizes of communities.

This matter of the proper allocation of births and deaths to usual place of residence is of much greater concern than is generally realized. A good beginning was made some time ago, but most of the gains then made have now been lost. Even at its best, however, this allocation of births and deaths to place of usual residence has never been detailed enough to enable the demographer to calculate age-specific rates for urban and rural populations and for different sizes of urban communities. Nor has it given the details which would permit of calculating these rates for the important nativity and racial groups.

It needs no argument to convince anyone that the increasing use of urban hospitals by rural people is rendering urban and rural rates, as now generally calculated, of no account. Obviously if an appreciable proportion of the

births and deaths of rural residents occur in city hospitals both rural and urban rates are thrown askew and we cannot know just how they differ or even whether they differ at all. The demographer is extremely anxious, therefore, to have birth and death registrations recorded by place of usual residence for all sizes of communities, for all race and nativity groups, and for different social classes. At present all we know is that rural birth rates and death rates are generally too low while urban rates are generally too high and that the rates of most of these other groups differ from one another. Hence, we are not able to calculate satisfactory life tables for different types of communities, to study differential birth rates in detail, nor to calculate occupational death rates with any degree of certainty. In attempting to compare even crude urban and rural death rates at the present time we are compelled to compare states which are chiefly urban with states which are primarily rural rather than to compare actual urban and rural communities. One need scarcely say that such a procedure is far from satisfactory, while in studying many other group differences we are even more at sea. One of the most urgent problems in the field of vital statistics is to secure the proper allocation of births and deaths to the community of usual residence and then to tabulate results in such detail that a true picture of population movements can be drawn. It is devoutly to be hoped that the influence of this organization will be exerted to the utmost to secure these improvements in our vital statistics.

The demographer also feels that there is need of closer coöperation between students of vital statistics and those interested primarily in population. Closer collaboration between officials in these fields would enable both to make their data more useful to the demographer and indeed to the public at large. If the vital statistician knew that he could get the needed population data it would be possible for him to make more elaborate tabulations of his data in and near census years and thus carry forward many interesting and instructive studies at those times. I do not believe I exaggerate when I say that population and vital statistics studies have both suffered considerably from the lack of closer coöperation. This should not be.

The demographer also needs uniform data for all groups from all areas. Unfortunately such uniformity does not now prevail. As a concrete instance of lack of uniformity I may cite the fact that in some states Mexican births and deaths are included with those of the white population, while in others most of them are listed as Mexican. As a result of such confusion we can secure little real information regarding the population movements of either the whites or the Mexicans.

Finally I would say a word about marriage data. These are not as important to the demographer as birth and death data but they are sufficiently important to merit more careful registration and tabulation than they now get. Changes in age at marriage, proportion of remarriages, proportion of mixed nativity and racial marriages, and many other facts with regard to marriage would assist materially in keeping our population inventory up-to-date so that we could evaluate more accurately population growth in relation to the general situation at any given moment. At present we have no federal agency gathering data on marriage and divorce. Furthermore such data as have been gathered in the past are pitifully inadequate to show the movements in this field. It is greatly to be hoped that this type of vital statistics will soon receive a much larger meed of attention.

Consumer Demand for Vital Statistics*

Viewpoint of the Registrar

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THE viewpoint of the registrar on the consumer demand for vital statistics often appears to be quite different from that of the consumer. There is a justifiable difference between the viewpoint of the consumer as to what constitutes a reasonable demand and the viewpoint of the state registrar who produces the data to meet the demand. The very fact that this word "viewpoint" has been used is a real indication that the consumer and the producer are getting closer together in their ideas and will undoubtedly make the work of each much more valuable through mutual understanding and hearty coöperation.

We have traveled over many rough roads in the field of vital statistics in this nation. Many of these roads, however, have now been paved or hard-surfaced through education and progress. It is encouraging to note that the state registrars are endeavoring to meet the demands of the consumers and, on the other hand, the consumers are qualifying their demands so that they are more in keeping with what is possible to produce.

In the beginning, the consumer should be advised that the equipment for producing vital statistics varies widely in different states. In some states where adequate vital statistics laws have been in effect over a long period of years and the early work of organization and the set-up of machinery for collecting, filing, and tabulating has become efficient, increased demands from the consumer are welcomed. In many states, the laws are new, the heads of registration districts who are known as local registrars are inexperienced and in most cases are busy men who can only devote a small portion of their time to registration, and in the central office a director (possibly only part-time) with 4 or 5 clerks is expected to handle registration affairs in the entire state. These are conditions which must be faced and, therefore, the consumer demands must be kept within the possibilities offered under such conditions.

A state vital statistics bureau is created and maintained by the tax payers of the state. Therefore, no matter what the consumer regards as of first importance in a vital statistics bureau, the officials in the bureau must first recognize the demands of the citizens of the state who are maintaining the bureau. From the viewpoint of the state registrar, the legal importance of the birth, death, marriage, and divorce records must be his first consideration because of his obligation to the tax payers or citizens.

To meet the need for complete legal data, it is necessary to have adequate laws and a system of registration districts in every state, numbering from

* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-fourth Annual Meeting, in Milwaukee, Wis., October 10, 1935.

500 to 2,000. There must be a local registrar in charge of each registration district and a state registrar who is responsible for complete registration. Original certificates must be collected from each district every month and delinquent local registrars removed or compelled to render efficient service. This, in itself, is a gigantic task in most states. Thousands of doctors, midwives, and undertakers must be supervised, and those who violate the law brought to a realization of their obligations or taken to court and prosecuted for their failure to observe the laws.

For legal purposes, a certificate should be complete; therefore, all incomplete certificates must be completed either through correspondence or personal contacts. Aside from the field work, in the central office the original certificates received must be carefully studied, corrected, and systematically filed. An alphabetical index is then an important routine which demands an amount of time which is no small consideration. From the records thus made available, certified copies are issued in enormous numbers. The task of searching through these records and issuing certified copies appears to have first place in the routine duties of a state registrar as these records are needed for court cases in deciding inheritances, payment of insurance policies, entrance to school, passports, veterans' compensation, and individuals' rights to accept employment and for many other purposes which have become more or less generally known.

Ten thousand certified copies in a single year for a population of 1,500,000 is not considered a high ratio for this class of work. Can you visualize the field work and office work and the amount of money for postage, clerical help, office rent, typewriters, furniture and fixtures necessary for producing the data outlined thus far? Can you imagine an office force in a state vital statistics bureau of 4 clerks, and expect complete registration and a systematic filing of records for permanent reference? More than one state has an office force in vital statistics thus limited.

Probably next in order is the obligation of the state registrar to the state health officer, state commissioner of health, and workers in the public health program of the state. Tabulations must be prepared for current releases, indicating the number of deaths from preventable causes for cities and counties within the state, and primary information as to the source or origin as well as the exact place of death, as a starting point for the health officer, epidemiologist, sanitary engineer, and public health nurse. This information must be available promptly each month with a résumé of accumulative totals by ages and by months, infant and maternal mortality rates, and disease rates for cities and counties. Annual tabulations for the previous year must also accompany this information for comparisons. Every state registrar who is faithfully performing his duty must have his vital statistics records in proper form for the state board of health at the earliest possible moment each month, as this information is a very important and essential part of the health workers' equipment.

The next obligation of a state registrar is to have a complete transcript of each birth and each death certificate promptly forwarded every month to the U. S. Bureau of the Census. While this part of the work does not require a great deal of time, it is of great importance and is an obligation that should be met very promptly each month. Each registration district is an important unit in a state, and each state is an important unit in national registration. The coöperation of all

will, therefore, build a reservoir of reliable information from which the consumer may draw to meet his demands. The foregoing is a basic set-up for building and maintaining vital statistics records. Demands of the consumer, however, have been growing by leaps and bounds, and to meet the demands, the producer must still struggle for a larger crop and break this crop down into more sub-divisions to keep pace with current demands.

For working rates, authentic population figures must be available. Population estimates by years for cities and counties are necessary. This single item is much more troublesome and has drawn on the nervous energy of the state registrar to a much greater extent than some of the other problems which on first thought might be considered more difficult. Uniformity of rates will be had in proportion to the accuracy of the data collected and the reliability of population estimates used.

Specialized groups have a tendency to get far beyond the advancement of the average mind. Leaders should lead but the leader certainly should not get so far in advance of the average individual that he is lost. A planter may have definite knowledge as to the proper procedure in planting seed but results will be obtained to the extent that he imparts that knowledge to the laborer who does the planting under his supervision. The point is that the seed must be planted properly if a harvest is to be expected. A health officer may know the rules of living but his constituents in the state will enjoy good health only in proportion to the amount of his information that is imparted to the citizens of his state.

In addition to institutes and study groups, it is of vast importance that the public press be used intelligently for disseminating information of an educational nature. This may be accomplished in various ways. One method that has proved its worth is for the state registrar to become personally acquainted with a member of the newspaper staff in his community, cultivate his friendship and good will, have him call daily or several times each week, take him into his confidence, and talk vital statistics. If the state registrar will discuss his problems with the newspaper representative, it will create his personal interest in vital statistics by broadening his knowledge of the information that is available through central registration. A newspaper representative who has a working knowledge of vital statistics will write a much more beautiful and instructive news release than would be possible without his first having become acquainted with the material, its value, its importance, its necessity and its possibilities. To make vital statistics useful and helpful, it is necessary to have a thorough knowledge of the data and if the press reporter is without this knowledge, there is grave danger that more harm than good will result from press releases. A newspaper representative of character who has the confidence of the state registrar will publish helpful facts, educational material, and draw a true picture which will enlighten the citizen of his state.

A newspaper man is looking for news. If a state registrar is too scientific to be interested in news, the newspaper man will publish vital statistics according to his own ideas. There is news in vital statistics and there is material in every vital statistics bureau that is of interest to the public at large. The state registrar, therefore, should have a hand in guiding the press representative in selecting material which is honest, interesting and educational. This phase of the program of promoting vital statistics is of paramount importance.

Safety councils, insurance companies,

social workers, universities, public schools, public speakers, and a host of others keep a continuous flow of questionnaires coming to the vital statistics bureau. Every reasonable demand should be met by the state registrar in so far as it is physically possible. The state registrar is anxious to coöperate in every way. In states where vital statistics laws have been in effect long enough for the bureau to be well established, it is quite simple to cooperate liberally. On the other hand, in states where there is a very small group of workers in a vital statistics bureau and the daily load is heavy, it is often impossible to meet all demands.

The type of program that has been prepared for this Section meeting is an indication of a more sympathetic understanding between the producer and the consumer. When the producer realizes the needs of the consumer, and the consumer realizes the handicaps under which the producer is working, they will then find it not only possible but a pleasure to coöperate with each other. May we all look forward to the time when every bureau in the United States will have adequate funds, sufficient office and field personnel, and competent supervision to make available the necessary information to meet all the demands of the consumer.

Negro Physicians' Memorial Meeting

THE John A. Andrew Clinical Society, organized April, 1918, "for the advancement of Negro physicians and surgeons in the science and art of medicine and surgery and for the study and treatment of morbid conditions affecting thousands of needy sufferers in this section of the South," held its 25th Annual Clinic and 19th Annual Meeting at the John A. Andrew Memorial Hospital, Tuskegee Institute, Ala., April 5–11, 1936.

Some Practical Considerations in B. Pertussis Vaccine Preparation*

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IN the preparation of all bacterial vaccines, the essential problem is the same—to make available the specific antigens in a product which is safe for injection. But even the simplest preparation—a killed suspension of the bacteria concerned—involves innumerable technical difficulties. Before there is any basis for expecting satisfactory results, the requirements for an active vaccine must be determined and met. It seems entirely possible that failure at this point is responsible for the irregular, unsatisfactory results of various workers with *B. pertussis* vaccine—results which led to its omission from the list of *New and Non-official Remedies* of the American Medical Association in 1931.[1]

Recent reports, especially those of Madsen,[2] Sauer,[3] and our own,[4] in which more encouraging results have been obtained, emphasize particularly the need for using antigenically active cultures. A basis for considering this of great importance is found in the bacteriological studies of several workers, more recently by Leslie and Gardner,[5] Lawson,[6] and Shibley and Hoelscher.[7] In order to have clearly in mind the essential features of the preparations in use for these more recently reported studies, certain details of preparation and dosage are compared in Table I. The Kreuger antigen,[8] an extract of *B. pertussis,* is not included because it is outside the realm of the present discussion, which is concerned only with suspensions of whole bacteria. Future work may develop a more nearly optimum antigen for pertussis immunization. The immediate need however is an adequate trial of the whole organism suspension to form a basis for judging other preparations.

In comparing the 3 products in the table, it is seen that they are essentially similar. Each is made from "recently isolated" *B. pertussis* cultures, presumably Phase I, grown upon potato-glycerin agar enriched with blood. Each vaccine is standardized to 10 billion organisms per c.c. and is killed with a chemical agent. The chief difference between Madsen's and the other two workers' is in dosage, Madsen using a total of only 2.2 c.c. as compared with the 7 or 8 c.c. given by the others. The other differences are in kind of blood used to enrich the medium, in certain details of seeding and harvesting, and in choice of a killing agent. There is no experimental proof that these differences have any marked effect on the final product.

Last year we [10] discussed some of the basic problems connected with *B. pertussis* vaccine including choice of cul-

* Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

TABLE I

COMPARISON OF VACCINE PREPARATION AND DOSAGE

Comparison of	Madsen	Sauer	Kendrick and Eldering
	Bacillus Pertussis Vaccine Used by:		
Cultures Used	" Young strains " (Leslie & Gardner)	" Recently isolated "	" Phase I " (Leslie & Gardner)
Culture Medium			
Base	Bordet-Gengou + *Nutrient agar	Bordet-Gengou	Bordet-Gengou + 1% proteose-peptone
Blood	Horse 28%	Human 16%	Sheep 15%
Technical Factors			
Killing agent	1% formalin	0.5% phenol	1:10,000 merthiolate or 0.5% phenol
Washing	not recorded	none	once washed
Organisms per c.c.	10 Billion	10 Billion	10 Billion
Dosage			
Total	2.2 c.c.	8.0 c.c.	7.0 c.c.
Individual doses	I 0.5 II 0.7 III 1.0	I 1.0 + 1.0 II 1.5 + 1.5 III 1.5 + 1.5	I 1.0 II 1.5 III 1.5 IV 1.5 + 1.5
Interval	3 to 4 days	1 week	1 week

* Formula given by J. J. Miller [9]

tures, kind of medium, harvesting and washing of suspension, and standardization and testing of the final product. Certain inherent difficulties in the procedure were recognized. The experience of another year has called to our attention certain points which have been of practical value in our own work.

In the choice of cultures we have emphasized the importance of using those having Phase I characteristics. While these constitute most of the cultures isolated from patients with whooping cough, we should not lose sight of the possibility of an occasional atypical or related strain being encountered. We have isolated 9 cultures from patients with whooping cough which did not have all of the characteristics of Phase I *B. pertussis* but showed certain relationships to *B. bronchisepticus*. These cultures will be more completely described in a separate report. It is of interest that 1 of these strains was isolated from a vaccine-treated child who had clinical symptoms of mild whooping cough. We do not know as yet the significance of the finding of these cultures in relation to specific immunization but they do raise a question which requires further study. In the meantime we adhere strictly to the use of only Phase I cultures in *B. pertussis* vaccines.

An important practical problem in the preparation of the vaccine is *increasing the yield*. We have tried the addition of various substances to the Bordet-Gengou medium. Of those used, including lactic acid, cysteine, starch, yeast, and various carbohydrates and peptones, proteose peptone had the most marked effect. The

addition of 1 per cent of this peptone to the base medium, all other details of procedure remaining unchanged, approximately doubled the yield on the first sub-culture. In order to determine any possible effect upon the state of the organism, comparative agglutination tests and rabbit skin tests were made on the 10th successive sub-culture. No change in the organism could be detected by these tests. Colony appearance including hemolytic zone were typical on first sub-culture back to the unmodified medium. However, since the growth on the peptone medium is quite heavy, the cultures tend to die rather rapidly when stored, and stock cultures are kept with greater safety on medium without peptone. Adaptation of the organism to the peptone medium is not necessary. The first sub-culture seems to grow as heavily as do later ones. Subsequent trials with neopeptone showed it to be as effective as the proteose. Bacto peptone does not appear to increase the growth.

In connection with increasing the yield, the importance of a *heavy inoculum for seeding* cannot be too strongly emphasized. In early lots of vaccine we used the growth from 1 slant to plant 1 500 c.c. Blake bottle but found a heavier inoculum was needed. We now use the growth from the regular vaccine bottles or flasks for seeding—1 bottle yielding sufficient growth to plant 6 or 7 others of the same size. If 500 c.c. Blake bottles are used, the inoculum per bottle is approximately 3 c.c. of a 10 billion per c.c. suspension.

Another factor of importance in increasing the yield is the *extension of the incubation period* from the usual 48 hours to 72 hours, at which time the culture's growth is at its maximum. Beyond the 3rd day the growth becomes more adherent to the medium, making harvesting difficult. In order to detect any possible change in a culture incubated for longer than 48 hours we compared suspensions of a culture incubated for varying periods up to 6 days. The agglutinability with Phase I serum and skin test reactions in rabbits were practically the same. The suspensions were tested also for virulence. An experiment using 18 mice indicated no marked loss in virulence with longer incubation periods until 5 to 6 days—the suspension from the 6 day culture killed none of 3 mice while the 72 hour culture killed all of 3 mice. The 72 hour culture appears to be at its height with respect to cultural characteristics, ease of harvesting, and quantity of growth and therefore is being used for vaccine production.

Standardization of the strength of the final suspension has received considerable attention. Several methods of adjusting the suspension to 10 billion organisms per c.c. have been tried. Widely divergent results, even by the same individual were obtained with counts both by Wright's method and by direct counts in a Petroff-Hauser chamber. Only by averaging an extended series of counts on any particular suspension can one hope for a relatively accurate result.

Not satisfied with counting as a routine procedure, we tried the *Hopkins' method* and found that a 0.3 per cent suspension—that is, one in which the packed sediment obtained by centrifugation represents 0.3 per cent of the total volume—was comparable to a 10 billion suspension as determined by a long series of counts. Our first observations on a number of suspensions showed that repeated Hopkins' tube findings on the same lot of vaccine checked closely, and the method seemed practicable. Since then, we have had several lots of vaccine that could not be standardized in this way as the sediment would not pack

tightly in the tube and the supernatant fluid remained somewhat cloudy even after prolonged centrifugation. As a further disadvantage of this method, the suspensions to be standardized had to be adjusted by turbidity to approximately 10 billion per c.c. before testing by centrifugation, if uniform results were to be obtained. For example, if a suspension giving a Hopkins' tube reading of 0.6 per cent is diluted 1:2 and retested, it does not give the 0.3 per cent reading that one would expect but one below that figure.

We thought that possibly adjustment according to turbidity would assure more uniform preparations than the other methods tried. After adjustment of many suspensions we adopted a technic which requires comparison of several dilutions of the vaccine under test with a graded series of turbidity standards. These standards are prepared from a *B. pertussis* suspension which has been standardized according to a series of counts and Hopkins' tube determinations. It is important that the standard suspension be prepared under the exact conditions of the vaccines to be standardized. For example, a 10 billion per c.c. standard prepared from a washed filtered suspension might not be comparable in turbidity to one prepared from an unwashed suspension which has retained some opacity due to medium products.

We believe that a turbidity method properly carried out is as practicable and reliable as any other so far proposed. It is significant that others who have given this matter consideration have come to a similar conclusion. In the *Annual Report* of the Division of Laboratories and Research of the New York State Department of Health for 1933, Dr. Lyall states that the standardization of suspensions of *B. pertussis* by turbidity had been adopted and that the method had proved dependable.

In *testing the sterility* of *B. pertussis* vaccines certain growth requirements of the organism should be considered. Since *B. pertussis* grows with difficulty, if at all in deep layers of broth, the usual dextrose broth sterility tubes are insufficient for testing this vaccine. We have therefore added to the usual sterility tests, platings of the vaccine on pertussis vaccine medium and on blood agar. These plates are used in preliminary tests as well as in the final tests made from the filled containers. Although the primary purpose in using solid medium was to determine whether or not *B. pertussis* had been killed, we found on several occasions that certain contaminants that failed to grow in

TABLE II

AGGLUTININ PRODUCTION BY VACCINES STORED FOR VARYING PERIODS

	Freshly Prepared Vaccine			*Vaccine After Storage*		
Vaccine Lot No.	*Storage Period*	*Rabbit No.*	*Agglutination Titer*	*Storage Period*	*Rabbit No.*	*Agglutination Titer*
(Merthiolate) 1:10,000						
16/20	7 Da.	R 157	1:20,000	15 Mo.	R 182	1:10,000
23	3 Mo.	R 174	1:10,000	....	......	....
28	4 Da.	R 186	1:25,000	....	......	....
(Phenol 0.5%)						
7 CB	1 Mo.	R 155	1:25,000	16 Mo.	R 183	1: 2,500
7 CB	1 Mo.	R 156	1:25,000	....	......	....
7 M	2 Mo.	R 166	1:15,000	10 Mo.	R 184	1: 5,000
26	2 Mo.	R 180	1: 7,500	10 Mo.	R 185	1: 2,500

the broth were detected on the plates. This is in accordance with the report of Rosenstein and Levin,[11] who concluded that both solid and liquid media are necessary in testing the sterility of biological products.

The *keeping quality* of the vaccine is an important consideration. We were interested to know whether the antigenicity of *B. pertussis* near its expiration date—should that be placed, as usual for other bacterial vaccines, at 18 months after its preparation—would vary markedly from that of a relatively fresh preparation. We compared some suspensions of varying age as to their agglutinin production in rabbits under the same conditions of injection and testing. The titers obtained 1 week after the last injection are given in Table II.

Seven rabbits injected with vaccines not more than 3 months after preparation gave titers ranging from 1:7,500 to 1:25,000. Definitely lower titers—from 1:2,500 to 1:10,000—were obtained in 4 rabbits injected with vaccines stored in the cold room from 10 to 16 months. Vaccines 7 M and 7 CB tested before and after storage showed the greatest loss in ability to produce agglutinins. As these suspensions were phenolized, the question arose as to the effect of the preservative on the keeping quality of the vaccine. The suspension preserved with merthiolate did not show as marked changes in agglutination titer after storage. However, a series of opsono-cytophagic tests on the same animals showed no such differences between fresh suspensions and the older ones. The really significant point is whether there is a loss of protective power with continued storage of the vaccine. Information can be gained on this point only after we can analyze the cases of whooping cough in vaccine-treated children correlated with the age of the vaccine used.

No attempt is made in this report to give the detailed methods of vaccine preparation which we are using. The outline of technic is included in the manual of methods prepared by Dr. Stovall's committee.[12]

SUMMARY

The addition of proteose or neopeptone to the base of Bordet-Gengou medium has been found to increase the growth of *B. pertussis*, thereby increasing the yield for vaccine. Other factors which have been found to influence the yield favorably are the use of a heavy inoculum for seeding and an incubation period of 72 instead of the usual 48 hours.

Comparative tests indicate some decrease in the ability of suspensions more than a year old to produce agglutinins in rabbits, compared with relatively fresh suspensions. No particular difference due to age is indicated by opsono-cytophagic tests. Information is lacking as to the correlation with protective power.

Mention is made of a small group of cases of whooping cough in which *B. pertussis* was not isolated; the organisms isolated had certain characteristics of *B. pertussis* but were definitely related to *B. bronchisepticus*. The question is raised as to the possible significance of these cultures with respect to specific immunization.

For standardization of the final product, it is suggested that under the specified conditions, turbidity comparisons with a graded series of dilutions of a standard suspension give relatively uniform and reliable results. In the testing of the final product for sterility, the use of plates of pertussis vaccine medium and of blood agar in addition to the usual sterility broth is suggested.

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Health Code on National Basis

APPOINTMENT of 8 health officers to an advisory board which will aid in formulating a standard public health code was announced on April 18 by the U. S. Public Health Service. The aim is to assure the coöperation of cities and towns in a project sponsored by the Treasury Department.

Chief benefits from the formation of such a code will be that every community in the country will have before it a model that has resulted from group and national judgment, giving it a much sounder position.

The advisory committee will hold its first meeting this summer. Those appointed are W. F. Walker, Dr.P.H., Commonwealth Fund, New York; H. F. Vaughan, Dr.P.H., City Health Commissioner, Detroit, Mich.; Hugh R. Leavell, M.D., City Health Officer, Louisville, Ky.; A. D. Weston, Chief Sanitary Engineer, State Health Department, Boston, Mass.; H. A. Whittaker, Chief Sanitary Engineer, State Health Department, Minneapolis, Minn.; J. N. Baker, M.D., State Health Officer, Montgomery, Ala.; Earle G. Brown, M.D., State Health Officer, Topeka, Kan., and George C. Ruhland, M.D., Health Commissioner, District of Columbia.

The first problem will be for each city or community to bring its present health code into conformity with a tentative draft under 5 headings:

1. Organization
2. Control of cases of communicable diseases
3. Control of environment; including food and meat, food establishments and restaurants; milk and milk products; ice cream and other frozen products; water supplies, excreta, insects and rodents, industrial sanitation, schools, swimming pools, tourist camps and homes, barber shops, buildings and premises, smoke abatement, domestic animals and pests, disposal of dead bodies, and nuisances
4. Birth, morbidity and mortality reporting, and the keeping of records
5. Education and publicity and the right of entry

Relationship of the Public Health Nurse to the Part-time Local Health Officer in Communicable Disease Work*

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ABOUT 1 year ago a study was undertaken in certain representative counties of New York State, to determine the status of communicable disease nursing. This study was instituted partly as a means of gaining the interest and attention of the local workers in the educational program tentatively planned for them; and partly to gather information regarding present practices in communicable disease nursing.

Investigation showed a wide diversity of thought and practice, and it was soon realized that the content of a communicable disease nursing program was so poorly outlined that the relationship of the health officer to the nurse in this work needed definition, as the division of labor between the two was seldom clear. Therefore, early in the study attention was directed to this fundamental problem of interrelationship of health officer and public health nurse, upon which all details of practice and procedure must be based. This paper is a progress report on a study designed for this purpose.

The organization of local health work in New York State with respect to local health officers and public health nurses should be understood. Each incorporated village and each township in a county is required to have a health officer (unless a county health department is established), though occasionally the same physician is health officer for one or more townships. There is no such requirement in respect to public health nurses, and the number of official public health nurses in a county depends upon the wishes of the political governing body, consequently is a very variable quantity. The situation in Onondaga County outside of Syracuse is typical of a good many in the state. It might be considered a good example of the mean, as there are counties with only 1 county nurse for 16 or more health officers, and others with 1 nurse to each 2 or 3 health officers. In this county, there are 4 county nurses, 1 township nurse and 25 health officers serving a population of about 90,000. The 4 county nurses each cover 6 health officers' districts and the township nurse has 2 health officers' districts. This arrangement means that each health officer has only one-sixth of a nurse's time and therefore the relationship is not nearly so close as it would be if their territories were coextensive, and 1

* Read at a Joint Session of the Public Health Nursing and Epidemiology Sections of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 9, 1935.

health officer had the full time of 1 nurse whose activities he could direct.

The study was conducted by means of personal conferences with the local health officers, and group and individual conferences with the public health nurses, including school and all other nursing agencies in a district. Districts were chosen which represented different types of population in various sections in the state. One hundred and twenty-three health officers were interviewed in 11 counties which included rural areas in the center of the state where dairy farming is the main occupation, counties in the Adirondacks, a mountainous section, counties on the Hudson River and in Nassau County on Long Island, the last named a densely populated largely suburban area. Sixty-two nurses were seen in individual conferences and 23 group conferences were held with an attendance of about 250 nurses. Discussion was encouraged, and the investigator gained much information in this way. No set form was used in the investigation but an attempt was made to obtain answers to the following questions:

1. What was the relative importance of the communicable disease service in the public health nursing program as carried on in these counties? and what was the amount of actual nursing care given?
2. How many health officers visit all cases of communicable disease reported to them?
3. In how many localities does the public health nurse visit all reported cases?
4. When the nurse does not visit all reported cases, on what basis and by whom are the cases she visits selected? Does she select the cases to be visited, or does the health officer do so?
5. Is the nurse informed of the incidence of communicable disease in her territory?
6. What is the teaching content of the nurse's visit?
7. Who does the following procedures:
    a. Taking throat cultures for diagnosis and for release, of cases, and contacts?
    b. Obtaining typhoid specimens?
    c. Making out epidemiological investigation cards?

Other questions, such as the type of nursing record used, the system of reporting between health officers and schools, the use made of pamphlets giving information about the diseases, etc., were investigated, but these are not pertinent to the particular phase of the study here reported.

The diversity of practice and thinking will be clearly seen in a detailed analysis of the material gathered in these conferences. It was found that the 123 health officers could be roughly classified in respect to communicable disease procedures into 3 groups: (1) 57 who thought communicable disease cases should be visited routinely by the public health nurse; (2) 44 who thought only certain types of cases should be visited, and (3) 22 who did not think the public health nurse should visit any communicable disease cases except in rare instances.

In the first group of 57 were included only the health officers who thought the nurse should be informed of every reported case of communicable disease in her territory and should visit all of them as the health officer's deputy for purposes of instruction and demonstration. She should visit them, making the selection of cases—if all could not be seen—according to the disease, the age of the non-immunes in the family, and other such criteria, rather than according to economic status or the wishes of the private physician.

The second group of 44 thought the nurse should only visit certain groups of people, such as indigents or the foreign born. Among the 44 were included those health officers who were not particularly interested in communicable disease, or had had very few cases in their territory, or saw no great need for a nurse's visit, but were perfectly agreeable and willing to have her visit.

The remaining 22 definitely did not wish the public health nurse to visit

communicable disease cases unless they called her for some special reason. The reasons they did not wish her to do so included the following:

1. That it was not safe to have a nurse visit communicable disease cases and other cases at the same time. (Health officers expressed this opinion either as their own or one felt so strongly by the community that they would not dare oppose it.)
2. That there was no need for a nursing visit; the families could take care of themselves, and understood the regulations. (This same reason was given in a rural section where the people were said to be "self reliant" and in a wealthy residential community where most families had a private duty nurse.)
3. That the health officer himself made all the visits and that he gave detailed and careful instruction, rendering the nurse's visit superfluous.
4. That the families would object to being visited by a county nurse because they thought her sole function was care of the indigent.
5. Personality difficulties between the health officer and nurse accounted for a few of the objections.

Exclusive of the cities, in 9 local health officers' jurisdictions, the public health nurse is informed of every reported case of communicable disease. In 3 local health districts, all in Nassau County, the nurse visits in place of the health officer to instruct the family, and the health officer is called only if there is some special problem. He continues, as in other communities, to diagnose cases which do not have a physician, and to render consultation service to the private physician. In the other 6 districts (all in 1 county) the nurse's visit supplements the health officer's to cases that are quarantined; but when cases do not have to be quarantined, her visit frequently takes the place of the health officer's. Some county nurses recorded no communicable disease visits for a whole year, though probably a few were made and not recorded.

The removal of stringent quarantine regulations on measles and whooping cough has apparently had one rather unfortunate result. Many of the health officers think in terms of legal requirements and faithfully visit and instruct in all diseases that have to be placarded, such as scarlet fever and diphtheria, but as soon as this requirement is removed they stop visiting. As whooping cough has been causing more deaths in New York State than any other common communicable disease, and measles ranks second or third, depending on epidemic conditions, serious consideration should be given to methods which will keep these diseases under the supervision of the health department without imposing unnecessarily burdensome regulations.

There are those who believe that this is a place where the public health nurse can be of most service, for she can instruct regarding nursing care and urge continued medical attention even when there are no restrictive measures to be enforced; but in most instances the nurses have not recognized this opportunity, and in several communities where they visited all cases of quarantinable diseases they ignored measles and whooping cough.

Of 37 nurses for whom complete information was obtained, only 6 were informed of every reported case in their area. Only 4 of these visited measles and whooping cough as a regular part of their service. Three additional nurses were informed of, and visited only cases of quarantinable diseases.

Twenty-four of the 37 said they demonstrated or gave care where necessary, but they had no figures on the number of cases given care, and in some instances it was apparent that according to the nurse's judgment the need arose very seldom in the course of the year.

It is interesting to note that only 13 were ever called upon to make epidemiological investigations. It is hard

to know whether they are not used in this service more often because of deficiency in their basic training, or whether a nurse's investigation is inadequate due to the fact that she has so little practice.

Equally interesting is the fact that all 37 take an active part in promoting immunization against diphtheria. This might well be credited to the activities of the State Department of Health and other state-wide organizations, for in New York State as in other parts of the country a definite intensive drive was carried on to promote diphtheria immunization. The element of competition has entered in as this is a fairly easily measured service, and communities, local health departments, and public health nurses have vied with each other to obtain the best record.

One wonders whether one interest must necessarily crowd out others or whether a well balanced program could not be "sold" to the communities if the same method were used and the same amount of effort put into the undertaking.

In trying to analyze the reasons why communicable disease seemed in many instances to be the stepchild in the nurse's activities, though in theory of public health nursing it has its full share of emphasis, both historical and practical reasons were found. The practical problem lies in the fact that this is an emergency service which requires a visit to the case on the same day as it is reported, and if a nurse is covering a whole county—as was true in certain counties—she obviously cannot render this type of service; but this does not account for the other counties where nursing service was fairly adequate. Here the nurse's neglect of this service could be explained partly by her own feeling of insecurity due to her lack of knowledge of communicable diseases, which goes back in many cases to the absence of practical experience in communicable disease work in training.

The history of the development of public health may also have had an influence on this phase of nursing work. The part-time local health officers began their work when sanitation and control of communicable disease were the main functions of the health department. The nurse coming later, as the first full-time health worker, when the conception of public health had grown to include preventive and educational work in the maternity, infancy, child hygiene, and tuberculosis services, started her activities in these services that were not already being covered, leaving communicable disease in the hands of the health officer. There was also an idea prevalent, which still exists in the otherwise more progressive communities, that it was not safe for the nurse to visit communicable disease cases and other cases at the same time, though not for many years has this idea prevailed in regard to physicians.

There is one other reason which is closely connected with the fact that the health officer remained a part-time worker while the public health nurse devoted her full time, thought, and energy to the development of her work; that is, that in fields where she was not entirely dependent on the health officer, where she could find her own cases, plan her own program, and then simply submit it to him for approval, she has forged ahead. In the communicable disease service cases are reported to him and unless he wishes her to visit them she has no way of even knowing of their existence. Right or wrong, she has been able to develop her infant welfare and her prenatal services, and other similar services, largely through her own effort, but in communicable disease work where she is so much dependent on the health officer, she has stood still or gone backward.

The original purpose of the study was to obtain information regarding certain phases of communicable disease nursing, but questions much more fundamental than those originally outlined were raised. The immediate teaching program had to be changed, and further study of the whole program was indicated. Plans had been made to concentrate a great deal of effort on teaching nurses how to make epidemiological investigations, but it was found that very few ever made these investigations, and that before detailed instructions in record taking were given it would have to be decided whether this was a proper function of a public health nurse. It was found that there was a complete diversity of opinion on what the nurse should do, ranging from the 2 counties where neither the health officers nor the nurses considered communicable disease part of a nurse's work to the communities where the nurse visited all cases of communicable disease and the health officer only visited for special reasons.

There was also a difference of opinion on what should be done for a case of communicable disease by the health department. In general, there has been a change in conception of the work of the health department in this service from what might be called police work, to educational work. The public health nurse has been especially trained to do educational work in the home, and for this reason, with the more recent emphasis on the importance of care and education in communicable disease control work, she should perhaps take an increasingly important part in the program.

The conclusion was that there were a great many questions regarding policies and practice which had to be answered before an ideal program could be set up.

The first and all inclusive question is, What should the nurse do in a communicable disease program? To be more specific:

What responsibility has she in reporting cases, in selection of cases to be visited in education of the community?

Is her responsibility for the service such that she ought to be informed of every reported case whether she can visit them all or not?

Should a trend toward more nursing home visits for instruction and investigation be encouraged?

Should the health officer be urged not to delegate to the nurse some of the home visiting and instruction done by him in the past?

Should the nurse make epidemiological investigations? If so, should she make all of them, or only certain ones? When and for what reasons is the line to be drawn?

In short, what is the ideal division of labor in this service between health officer and public health nurse?

The fact that the results of this study have to be framed in the form of questions shows how poorly defined the communicable disease nursing program has been, especially in those aspects that border closest on the health officer's work. Disagreement not only in practice but also in theory was found among nurses and health officers interviewed.

While this is a report of conditions found in New York State, it was thought that similar conditions might prevail in other states faced with the problem of coördinating the part-time local health officer's service with the public health nurse's, and, therefore, it would be of more than local interest.

During the coming year an attempt is going to be made in New York to answer these questions by trying different programs in the field and studying their action and the results.

A Sequel to a Public Health Ruling Concerning Streptococcic Mastitis*

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THE state law defines milk as the normal lacteal secretion of one or more healthy cows. This indicates that market milk should be produced only by disease-free cows. Furthermore the average examination of normal cows' milk, as compiled from the results reported by numerous investigators, does not denote the presence of streptococci of mastitis. A survey was made in October, 1933, to determine the condition of raw market milk, in the city of Lansing, in so far as the presence of streptococci of mastitis was concerned. This check-up was made by culturing the milk in a differential medium containing 1–150,000 gentian violet which permitted development of the streptococci, but inhibited many other bacteria.

At this time 20 dairies were selling raw milk in Lansing; 18 were producer distributors, while 2 bought milk from a few farmers and distributed it in addition to that produced on their own farms. In the initial check-up streptococci of mastitis were found in the milk from 18 of the dairies, but not in the milk from 2. The check-ups were started in 1933 and continued at intervals to the present. These results are presented in Table I and will be discussed later.

The prevalence of streptococcic mastitis among the herds was such as to warrant further attention. The following facts were deemed sufficient to permit the City Board of Health to do something about the situation:

1. In certain cases streptococci that cause mastitis have been found to be the cause of human infection. This includes the *Streptococcus epidemicus* as well as other streptococci of human and bovine origin that cause mastitis. The human infection usually takes the form of septic sore throat epidemics when *Streptococcus epidemicus* is concerned and individual cases of sore throat together with further complications when streptococci of bovine origin are involved. The city consumer as well as the farm consumer is exposed to this possible health hazard when streptococcus-infected milk is used in the raw state.

2. When streptococcus infection is present in a herd there is always danger of spread. It is important that the dairyman eliminate the infected cows from the herd if he hopes to produce a high quality milk and reduce his herd wastage.

3. The bacteriological quality of the milk produced by infected cows has a high bacteria count, poor methylene blue reduction test quality, high leucocyte content, and high chloride content which gives rise to a salty taste; in addition abnormal odors of producers' milk have been traced to the presence of excessive amounts of infected milk in the supply.

4. Since this work was started, Shaw and Beam[1] have reported that mastitis-infected cows produce 22 per cent less milk and 24

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* Journal article No. 240 (N.S.) Mich. Agri. Exper. Sta. Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

TABLE I

RESULTS OF EXAMINATION OF BOTTLED RAW MILKS FOR THE PRESENCE OF STREPTOCOCCI OF MASTITIS AT VARIOUS PERIODS INDICATED

Streptococci of Mastitis in Bottled Raw Milk *

Dairy	10/2/33	4/10/34	12/4/34	4/3/35	4/30/35	5/22/35	6/18/35	7/16/35	8/11/35	9/17/35	10/3/35	10/20/35
1	—	—	—	—	—	—	—	—	—	—	—	—
2	+	—	—	—	—	—	—	—	—	—	—	—
3	—	—	—	+	+	+	+	+	+	+	—	—
4	+	+	+	—	—	—	—	—	—	—	—	—
5	+	+	+	—	—	—	—	—	—	—	—	—
6	+	+	+	—	—	—	—	—	—	—	—	—
7	+	+	+	—	—	—	—	—	—	—	—	—
8	+	+	+	+	—	—	—	—	—	—	—	—
9	+	+	+	+	—	—	—	—	—	—	—	—
10	+	+	+	+	—	—	—	—	—	—	—	—
11	+	+	+	—	—	—	—	—	+	—	—	—
12	+	+	+	+	+	+	+	+	+	+	—	—
13	+	+	+	+	+	+	+	+	+	+	—	—
14	+	+	+	+	+	+	+	+	+	+	+	+
15	+	+	+	+	+	+	+	+	+	+	+	+
16	+	+	+	+	+	+	+	+	+	+	+	+
17	+	+	+	+	+	+	+	+	+	(start pasteurization)		
18	+	+	+	+	+	+	+	+	+	"	"	
19	+	+	+	+	+	(discontinued selling milk)						
20	+	+	+	—	—	—	—	—	—	(discontinued selling)		

* (+) streptococci of mastitis (—) streptococci of mastitis not present

per cent less fat than normal cows. This is sufficient to warrant some action on the part of the producer to cope with the disease.

In an effort to increase the quality of raw milk and reduce any possible health hazard the Lansing Board of Health passed a ruling reading:

> All raw milk sold in the City of Lansing must be produced by cows free from streptococcic mastitis (infectious mastitis) as determined by two weekly tests by the microscopic method described in *Veterinary Medicine*, 30, 4 (Apr.), 1935. Animals producing such raw milk must be tested every 6 months thereafter and found free of infectious mastitis. Any reacting animals must be removed from the herd.

This was passed in April, 1935, following which the testing of herds concerned was begun.

Each herd was visited and 10 c.c. samples were collected from each milking cow. The udder was wiped with a cloth moistened with a chlorine solution. Several streams were discarded from each quarter, and milk in approximately equal quantities was collected from each quarter by milking directly into the sterile tube. Cows that freshened were tested from time to time. The mastitis found in each herd upon initial test is presented in Table II, as well as the condition 6 months later. Of 316 cows being milked at the time of the check-up in April, 151 were found to be infected while 165 were mastitis-free. These results were reported to the dairymen concerned together with suggestions concerning the elimination of infected animals and replacement with mastitis-free cows. Where animals were purchased they were required to be free from streptococcic mastitis in addition to tuberculosis and Bang's disease.

During the next 6 months an educational program was followed rather than strict enforcement of the ruling. This gave the herd owners time to work out their own problems in obtaining streptococcic mastitis-free herds. Much was accomplished during this time for in the October check-up 237 cows were tested, 20 in 3 herds were infected while 217 in 14 herds were mastitis-free. Two

dairies, which previously sold raw milk, began to pasteurize due to the high incidence of infection in their producing herds. The 3 dairies now having infected cows are expecting to replace them with mastitis-free animals. Fine coöperation was experienced between the dairies and the City Health Department in advancing the standards of Lansing raw milk.

Check-ups were made on the bottled products of dairies selling raw milk (Table I). A study of these data, along with those in Table II, indicate the value of such an examination as a check on the presence of infection in producing cows. In each case where all animals were tested and the infected ones eliminated no streptococci of mastitis were found in the bottled milk. It is of interest to note that streptococci were found in the milk of dairies 3 and 11 following a period during which no streptococci were found. It was found that certain infected animals freshened, and their milk was included in the main supply. When these cows were eliminated the bottled milk again gave a negative result when tested.

The Board of Health of Flint, Mich., has passed a ruling similar to the one here discussed.

SUMMARY

A City Board of Health ruling is discussed which resulted from a pioneer effort to improve the quality of an already good raw milk supply in addition to making it safer.

Animals infected with streptococci of mastitis were eliminated thus estab-

TABLE II

THE NUMBER OF INFECTED AND NON-INFECTED COWS IN EACH HERD WHEN THE BOARD OF HEALTH RULING WENT INTO EFFECT AND 6 MONTHS LATER

	Number of Milking Cows			
	April, 1935		*October, 1935*	
Dairy	*Infected*	*Not Infected*	*Infected*	*Not Infected*
1	0	17	0	20
2	1	5	0	6
3	4	14	0	15
4	1	7	0	6
5	16	10	0	13
6	22	12	0	22
7	6	6	0	12
8	3	9	0	15
9	1	6	0	7
10	6	5	0	14
11	10	4	0	11
12	1	8	0	9
13	24	34	0	32
14	17	7	16	16
15	4	0	1	2
16	4	3	3	4
17	9	6	(Is pasteurizing now)	
18	20	0	(Is pasteurizing now)	
19	(Discontinued selling before the herd was tested)			
20	2	11	0	13 *
Total	151	165	20	217

* Discontinued selling milk

lishing streptococcic mastitis-free herds. Retests were made 6 months later and will be made every 6 months hereafter.

Animals purchased for addition to the herd were tested for streptococcic mastitis before purchase or bought subject to such test.

The producers were greatly benefitted as a result of such testing and elimination of the infected cows, for a higher quality of milk was produced and at the same time a marked decline of herd wastage resulted.

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Population of the United States

A POPULATION bulletin released by the Federal Census Bureau, estimates the population of the United States, as of July 1, 1935, at 127,521,000. The estimated annual increase since 1930 has averaged 904,000 per year; this is only slightly more than half the annual increase between 1920 and 1930, which was 1,665,000. The relative increase in population at present is about 0.7 per cent per year.

The annual increase for the United States as a whole was calculated by the use of birth and death figures (after correction for incomplete reporting), and net immigration.

No estimates for states or cities have as yet been given out, because of the difficulty of allowing for the pronounced and irregular population movements during the past 5 years.

Prior to 1930, the bureau has calculated the local populations by the arithmetic projection method. From 1930 to 1934 it has used the method of apportioning among the states and cities, the estimated increase in the country as a whole. This method allows for the fact that the average annual increase since 1930 is smaller than in the preceding decade, but also assumes a rural to urban migration which has not occurred since 1931. This method, like the arithmetic projection method, is therefore believed to be unsatisfactory for states and cities.

The use of current local data are recommended in making these population estimates. When, of necessity, the apportioning method must be used, estimates for cities and states should be checked against school enrollment figures, directory counts, and other local data which might indicate the extent of probable population growth.

A. W. H.

Practical Criteria and Methods for the Identification of Hemolytic Streptococci*

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BECAUSE of the relatively high incidence and severity of hemolytic streptococcus infections, their control is one of the major public health problems. Although progress has been made in the development of specific therapeutic measures, notably in the anti-streptococcus sera of increased potency and valency now more generally available, the efficacy of such treatment is dependent upon its administration early in the disease and thus upon prompt diagnosis. Similarly, the control of outbreaks of infections such as scarlet fever and septic sore throat necessitates early diagnosis and detection of the source of the incitant. For these purposes clinical and epidemiological observations require the confirmatory data which result from pertinent bacteriological examinations. As a preliminary step in the standardization of methods for the isolation and identification of hemolytic streptococci, tentative procedures[1] for such examinations have been formulated and submitted to the Committee on Standard Methods of the Laboratory Section of this Association.

The choice of procedures is complicated by the innumerable slight variations in the biological properties of this group of microörganisms. Thus, the differences in growth requirements and hemolytic activity—which are especially marked when the strains are first cultivated on artificial media—must be considered both in the preparation of the medium for the plating of specimens and in the incubation of the primary cultures. A 5 per cent defibrinated horse, rabbit, or human blood agar medium, the agar base of which is prepared from beef heart infusion with precautions against the loss of growth promoting substances, furnishes adequate nutritive material even for strains which grow sparsely. This medium also provides the conditions necessary for the detection of hemolysis, since it has a high buffer content and contains no added dextrose, the presence of which inhibits the hemolytic activity of some strains. Furthermore, by plating each specimen in duplicate and incubating these streak plates anaerobically and under partial carbon dioxide tension, growth and hemolytic activity are increased and the need for the more complicated technic of pour plates is avoided. The aerobic incubation of fishings to blood agar which aids in establishing their purity and the tube

* Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

test for hemolysis serve to eliminate those microörganisms, such as pneumococci, which hemolyze blood agar when grown under anaerobic conditions. There remains, therefore, only the determination of the morphology of broth cultures of those fishings which induce hemolysis to establish the presence of hemolytic streptococci.

In the examination of some specimens, such as blood, spinal fluid, and in some instances purulent discharges, the finding of Gram-positive cocci which form chains when grown in liquid medium and hemolyze red blood cells suffices to establish their etiological relationship. However, the presence in the normal nose and throat and in the udders of cows of hemolytic streptococci, usually considered of little importance in human infections, makes a more comprehensive study of strains from these sources imperative, particularly when they are examined in connection with the investigation of outbreaks, in order that their probable pathogenic relationship may be established. Of the procedures available for this purpose the final hydrogen ion concentration of 1 per cent dextrose broth cultures, the hydrolysis of sodium hippurate, the fermentation of trehalose and sorbitol, and the group-precipitation test yield the most practical differential results.

Each of the biochemical tests serves to eliminate a certain number of strains which appear to play relatively insignificant rôles in human disease. Of the cultures remaining, namely those which produce a final pH of 4.6 or higher in dextrose broth, ferment trehalose, and fail to ferment sorbitol or to hydrolyze sodium hippurate, the majority belong to Group A according to the precipitation test. Since the members of this group have been found to be the strains commonly encountered in human infections, the precipitation test appears at present to be the most satisfactory single differential procedure; however, further information is needed concerning the pathogenic activities of certain other serological groups which have similar biochemical properties and are not infrequently isolated from human sources.

Until the various serological procedures for typing strains within a group are more fully investigated, evidence of the similarity between cultures from carriers and from cases in an outbreak—when both prove to be members of the group commonly encountered in human infections—must depend upon the failure to demonstrate differences between them. In such instances helpful differential data are not infrequently secured by the examination of the biochemical and toxigenic properties of the cultures. Furthermore, the study of the toxigenic characters may prove of very practical value not only in the control of epidemics but also in the treatment of cases, if and when the hemolytic streptococci are classified according to toxin group, and thus in relation to the antitoxic or antibacterial sera, rather than by disease entity.

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Vol. 26

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

WHOOPING COUGH

FOR three successive years we have published articles on whooping cough by Kendrick and her associates.[1, 2, 3] The latest paper [4] summarizes observations on 1,592 children, 712 in the test group, and 880 in the control group. There have been 67 cases of whooping cough, of which 63 occurred among controls.

We have also published the results obtained by Sauer [5] with his vaccine. Among private patients he has obtained 87.5 per cent protection in 458 children, 93.4 per cent among 604 vaccinated at the Health Department of Evanston, Ill., and 95 per cent of 242 children in two orphanages, making an average of 92 per cent protection in 1,304 cases. *The British Medical Journal,*[6] in commenting on his results, speaks of his reports as "commendably cautious." The same publication has given us a careful review of the results obtained in this country as well as others, and concludes that while we must take every possible precaution against testimony which is premature and inadequate, "there is every probability that when the proper dosage of vaccine is known we shall be able to protect children against whooping cough." The Council on Pharmacy and Chemistry of the American Medical Association,[7] in March, 1935, declined to express an opinion on any of the vaccines on the market, saying that they preferred to await evidence which was more positive than that at hand.

Sauer insists that the vaccine is an immunizing and not a curative agent, that several months are required for complete immunization, and that even by the most improved method, about 10 per cent of the treated children contract whooping cough on exposure to infection. In evaluating the usefulness of the vaccine it must be remembered that some 25 per cent of children exposed in epidemics escape even when not vaccinated. As most deaths occur during the first 2 years, he advises early immunization, and believes that the best age is between the 6th and 8th months of life. Substantially, he agrees with the authorities of the Danish State Serum Institute on these points and holds that a freshly isolated hemolytic strain must be used as antigen. For the commercial laboratories licensed by him, fresh strains are supplied monthly.

It is unnecessary to remind health officers of the prevalence and dangers of whooping cough, though there can be little doubt that the average doctor, and no doubt the public in general, regard whooping cough as a more or less trivial disease. Certainly its serious nature is not generally appreciated.

In a series of 54,000 deaths from whooping cough, more than 50 per cent occurred in the first year of life; hence it is evident that Sauer's advice of early immunization is sound. In England, there are some 2,000 or 3,000 deaths in children every year, and in London alone, 40,000 cases occur. In view of its comparatively high mortality, and the fact that treatment is unsatisfactory, in immunization lies our chief hope. Topley [8] advises careful field trials rigidly controlled before wholesale immunization as favored by Sauer can be recommended. Certainly here is a field for the immunologists. We are proud of the commendable work done by members of our Association and given to the profession in our *Journal.*

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ROYALTY AND PUBLIC HEALTH

THE journals which are reaching us from England are notable for the tributes which they carry to the late King George, who died on January 20, 1936. The world has joined with the English in their sorrow for a great and most beloved King.

Apart from the tributes to him as a man and a king, special emphasis is laid on his interest in public health. One obituary [1] says, "health, indeed, was a talent with which from end to end of his reign the King was apt to trade." *Public Health* [1] in quoting this says:

In all probability this is true (perhaps it is the case with all who are vowed to the service of the public), and many a time in recent years that in what he did, it was duty and not his own health and strength that His Majesty had in mind, was clear. At the same time, however, if he made sacrifices of his own health it was equally clear that before him always as one of his greater concerns was the health and well-being of his people. That much of the wonderful progress in public health that marks the years of the late King's reign could be traced to His Majesty's expressed wish or initiative is certain. To some extent because of this the loss of King George must be regarded as a personal and very serious one by all engaged in the health service of the public.

The Journal of State Medicine [2] says:

His interest in public health was but one of the many ways in which this concern showed itself. Whether it was in slum clearance and rehousing at home or in the hygiene of a dominion beyond the seas, in the welfare of mothers and children or the care of the sick, his inspiration, wise counsel, and encouragement were a constant source of strength to those whose duty it was to deal with these and other problems of public health and hygiene.

In the midst of the grief over the passing of King George, there is rejoicing that the new King, Edward VIII, shows as equally great interest as his beloved father in the cause of public health. Indeed, it is predicted that the "care of the public health will be a matter of first concern, and that the progress made will be equal to, if not indeed greater than, that which marked the period of the sovereignty of the ruler the nation now mourns." It is a matter of history that he has shown great sympathy for those whose health needs were greatest; that he made personal investigations in many parts of the Kingdom as a result of which he brought pressure to bear which has resulted in the tremendous activity now going on in England in relation to slum clearance, housing, and rehousing schemes. It is possible also that to him is due the recognition of the improvement of the problems of feeding and nutrition of the population. Happy indeed is England to have had father and son who were so much interested in the welfare of their people as successive rulers.

Public Health[3] gives a graceful acknowledgment of the cable sent by the American Public Health Association to the Royal Sanitary Institute on the death of King George. The feeling expressed on the part of our Association was sincere and was deeply appreciated by our public health colleagues in England.

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WESTERN BRANCH AMERICAN PUBLIC HEALTH ASSOCIATION

THE Western Branch will hold its Seventh Annual Meeting in Vancouver and Victoria, B. C., June 24 to 27, inclusive. Headquarters are at the Hotel Vancouver.*

Two and one-half days of the session will be devoted to joint meetings with the Canadian Public Health Association, Canadian Tuberculosis Association, and State and Provincial Health Authorities of North America. These three organizations will open their annual meeting in Vancouver on Monday, June 22. The combined efforts of the four organizations will attract a number of the leading public health authorities of this continent. There will be symposia on influenza, and health education; special sessions on vital statistics and public health nursing; discussions on control of rodent plague; industrial hygiene with special attention to silicosis; milk control; venereal disease control; tuberculosis control; the increasing public health importance of cancer and diabetes; Rocky Mountain spotted fever; and plans for a Western Public Health Training School.

The last day (Saturday) will be spent in Victoria, capital of the Province, as guests of Dr. H. E. Young, Provincial Health Officer. Members will be welcomed by the Lieutenant Governor of British Columbia and the Honorable Dr. G. Weir, Provincial Secretary. Trips will be arranged to the far-famed Butchardt's Gardens and to William Head, Dominion Government Quarantine Station. Victoria is a charming city, distinctly Canadian, with its Parliament Buildings, its beautiful port, and its delightful Empress Hotel. It is reached only by boat, either from Vancouver or Seattle.

* See page 548 for travel directions.

Vancouver is a beautiful city of approximately 120,000 population, which is this year celebrating the semi-centennial anniversary of its founding. In it is located the University of British Columbia, with its well developed public health laboratories. It is the Western terminus of the Canadian Pacific and the Canadian National Railways, and is reached from Seattle by way of the Great Northern or by boat. Large comfortable steamers leave Seattle daily at 9:00 A.M., arriving at Vancouver at 6:45 P.M., and at 11:00 P.M., arriving at 8:00 A.M.

The Western Branch meetings have been characterized by a refreshing informality, an attractive program, and a minimum of politics, factionalism, and finance. Starting with 125 members in 1928, it has now grown to well over 1,600, including 123 Fellows, 371 active members, and 1,134 regional members. Members of the American Public Health Association from outside the boundaries of the Western Branch are always welcome at its meetings.

The Canadian Public Health Association will welcome visitors to its sessions.

Dr. H. E. Young, President-Elect of the Western Branch and Chairman of the Committee on Meetings and Publications, and Dr. J. W. McIntosh, Vice-Chairman of this Committee and President of the Canadian Public Health Association, have enlisted every facility for hospitality and scientific interest in their two cities to contribute to the success of the meeting.

The officers of the Western Branch this year are: *President:* Dr. W. F. Cogswell, State Health Officer of Montana, Helena; *President-Elect:* Dr. H. E. Young, Provincial Health Officer of British Columbia, Victoria; *Vice-President:* Dr. J. D. Dunshee, State Health Officer of Idaho, Boise; *Vice-President:* Dr. J. L. Jones, State Health Officer of Utah, Salt Lake City; *Vice-President:* Dr. W. H. Kellogg, Director of State Hygienic Laboratory of California, Berkeley; *Secretary:* Dr. W. P. Shepard, Assistant Secretary, Metropolitan Life Insurance Company, San Francisco; *Treasurer:* W. F. Higby, Executive Secretary, California Tuberculosis Association, San Francisco; *Chairman of the Executive Committee:* Fred Stimpert, Director, State Hygienic Laboratory, Helena, Mont.

EDGAR SYDENSTRICKER

THE death of Edgar Sydenstricker cuts short, in middle age, a career of distinguished achievement. Entering the U. S. Public Health Service in 1915 as a statistician and economist to assist Dr. Benjamin S. Warren in a study of sickness insurance in European countries, he was almost immediately drawn into first one and then another of the field investigations undertaken by the Service, and within a few years had built up a statistical organization which gradually evolved, under his direction, into a permanent research unit, the Office of Statistical Investigations. With the exception of a little more than a year spent in Geneva, completing the organization of the Epidemiological Office in the Health Section of the League of Nations, he remained in charge of the Statistical Office until 1928, when he became Director of Research in the Milbank Memorial Fund, but continuing as Consultant, an active connection with the work which he had begun in the Public Health Service.

As chief of the statistical staff of the Public Health Service he was engaged, either independently, as collaborator, or as consultant, in statistical studies covering a wide range of subjects; epidemiology, industrial hygiene, the hygiene of infants, maternity and childhood, general morbidity and mortality. His chief

interest, however, was in the great mass of morbidity and physical impairment which falls outside of the usual public health records. In this field his work was that of a pioneer surveying the ground which the public health of the future must occupy, and showing its problems in clearer perspective.

Sydenstricker was primarily a student, but his part in public health was more than the collection and ordering of facts. He was profoundly interested in their effective use for the improvement of public health and he did not shrink from meeting squarely the difficulties that stood in the way. A man of sincere and simple modesty, he established the warmest of friendships, and through his personal contacts contributed no less to the moving spirit of public health than to its factual knowledge.

EDUCATIONAL ABSTRACTS *

EDUCATIONAL ABSTRACTS, Vol. I, No. 1, for January-February, 1936, has come to our desk. There is a distinguished board of Coöperating Editors, including representatives from many foreign countries. Education is treated of from 31 standpoints. Our readers will be interested in the Section of Health and Physical Education. There are abstracts in this first issue from 11 sources, all of which appear to be well selected as far as they go.

The format of the journal is quite attractive and patterned after the *Psychological Abstracts* which were the result of many years of psychological research in the field of reading efficiency. The editors propound four questions of the educational profession, the answers to which will help them in their further plans.

We welcome this new journal and wish for it all success.

* Edited by Norman J. Powell, with five Associate Editors. Published bimonthly at Albany, N. Y.

PUBLIC HEALTH EDUCATION*

UNDER our social system it is necessary not only to win the support of the governing body, but to reach into every home, familiarize the people with the functions of the health department, and explain the activities that are being carried out to meet these obligations. . . .

A preliminary step to any advance in preventive medicine or community hygiene is a campaign to acquaint the people with the advantages of the specific methods to be proposed. This presupposes a general and widespread knowledge of the principles of hygiene and community sanitation. This condition does not exist.—W. G. Smillie in *Public Health Administration in the United States.*

To Reach Into Every Home—The above quotations are discussed by Dr. E. E. Kleinschmidt in *Public Health Reviews*, University of Michigan, Ann Arbor, Mich. March 15, 1936. *Free.*

Education of the public in hygienic principles constitutes one of the major problems of the public health administrator today. . . . As a general rule budgetary allowance for such activities are only made when city fathers are inclined to feel generous, or when they believe that a health campaign justifies a temporary expenditure. . . . Thus, in time of distress, the best and often the only contact the health officer has with the public is cast aside.

This contact with the public is often the life-line of many a health department. Leading health administrators, cognizant of the value of this phase of health work, are constantly reminding us of its importance. . . .

This problem, it would appear, narrows down to one of public health salesmanship. Civic pride in good health can and is being stimulated through methods of public education. . . .

Mass methods in public health education are both necessary and inevitable if the problem aforementioned is to be successfully met. And yet, how many health departments are able to extend themselves in this direction? Tradition, lack of social insight into matters of public health, emotional attitudes toward health, poorly subsidized health education programs in the public schools, lack of community leadership in health education—these are the paramount public health problems which must needs be solved today.

Knowing that We May Lead—To know others is set up as an essential for "Leadership in Health Education," by M. C. Coleman, under that heading in *Womans Press,* 600 Lexington Ave., New York, N. Y. April, 1936. *20 cents.*

One essential to leadership with our younger generation is that we have a working knowledge of their mental processes and gear our machinery accordingly. Young people are fully agreed with our modern health education authorities in their belief that health is a means to an end, and not an end in itself. A young woman thoroughly uninterested in your concern over her poor posture comes to life when you casually mention her winged scapulae in relation to a backless evening gown, or to the backless and almost frontless bathing suit. She may be casual over her after-exercise shower and over an unbalanced diet until you suggest that one of these may decide for her whether she will have a complexion like a peach or a prune. Your classes in creative dancing, with bared feet, have made many a girl corn-and-bunion conscious enough to ask what type of shoes she should wear. It does not in the least

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

matter that the girl never suspects that this is one of our objectives in the creative dance; the wisdom of the serpent and the mildness of the dove each has its place in the psychology of the group leader.

Hygeia, April, 1936 — *Hygeia*, A.M.A., 535 N. Dearborn St., Chicago, Ill. *25 cents* a copy.

The public health nurse (her function) . . . Is your child going to camp? (how to choose camp) . . . Store teeth (explaining misunderstandings and complexities) . . . The most interesting subject in the world ("know thyself") . . . How disease came with the white man (slave trade) . . . Dietary delusions (past and present) . . . Exploiting the deaf . . . The road back (physical regeneration is possible) . . . The germs we live with (tubercle bacilli) . . . Beware the tick! . . . The skin in health and disease . . . Prevent asphyxial death . . . When your child is convalescing . . . "Sissy" (a play for children) . . . The peas pudding problem (another medical mystery) . . . Carl Josef Eberth (discovered cause of typhoid) . . . Behind the "tb." headlines (young people) . . . New books on health . . . Questions and answers . . . Curious stories about health (illustrated).

In "School and Health" will be found the following:

Should we blame children? (mental health) . . . A revolution in making a course of study in Virginia . . . We want children to be happy . . . A handy reference list in teaching cleanliness . . . Forming the habit of brushing the teeth daily . . . New health books for teachers and pupils.

A Health Gadget Wanted—The Tuberculosis and Health Society, 911 Locust St., St. Louis, Mo., yearns for something or other, not expensive, not inappropriate, to be offered to the followers of Captain Hardy:

Thelma Suggett tells us that

Captain Hardy, a jolly, robust character, goes on the air at 4:30 each Saturday afternoon, with the Health Twins, Bob and Jane. At first the programs consisted of an adventure story by Captain Hardy with a subtle health angle. During the past few weeks, however, we found it more effective to dramatize the programs, giving the Health Twins major parts also. A serial is being featured now with fictitious trips to many different countries, the child listeners writing in about what countries they wish to be taken to, in their imagination. Last week, for example, the story was built around the current flood disaster with thrills and adventure, the health angle being the importance of pure drinking water, etc.

We have been sponsoring this program only since December 7, and feel that our radio audience is not now as large as it will be later. Our idea for giving away a gadget to children who write in is, of course, a stimulus to regular listeners and fan mail.

A local radio station donates 15 minutes for this program each week. They coöperate beautifully by providing sound effects, theme song, etc.

This is not the first time that we have sponsored a radio program for children, but we do feel that we have in Captain Hardy the most effective character we have discovered so far.

Send your "give away" ideas direct to Miss Suggett.

Public Health Nursing Exhibited—In the Community Fund campaign exhibition, the Evansville (Ind.) Public Health Nursing Association was presented by the following, as recorded in *Public Health Nursing*, April, 1936:

This exhibit consisted of an immense topographical map of the City of Evansville through which had been made eight rectangular cutouts which allowed the spectator to look into miniature rooms, brightly lighted, in which were scenes representing the various activities of the Association. Each Lilliputian room contained all necessary equipment and furniture complete to the last detail of ruffled curtains and well paper! Dolls dressed as patients, nurses, and doctors were the actors upon the tiny stages.

Illustrated in this exhibit were activities such as a child health conference, a tuberculosis clinic, a prenatal home visit by the nurse, care of a maternity patient in the home, bedside nursing care of the sick in the home, and a demonstration by the public health nurse of milk modification for an infant.

Below each little room there was printed on the face of the map in half-inch type a short description of the activity demonstrated therein. All the windows were numbered, and on a table near the entrance of the booth were mimeographed sheets, explaining

in fuller detail—according to the numbers of *the windows—all the activities displayed* within the tiny rooms. Statistical reports to show the extent of the past year's work were distributed by board members to visitors. The board members were prepared to give out any other information which might be desired about the association. . . .

The map (15 feet x 6 feet) was painted on a three-piece, hinged screen made of beaver board. The health center was made the hub of the map and from this, 12 dotted lines radiated as spokes to each of the outlined 12 nursing districts. These dots were cut out and illuminated from the back through red papers so that they stood out distinctly, making the health center the "center" of all the activities of the association.

Metropolitan Publications — The pamphlets listed below are the more recent publications of the Metropolitan Life Insurance Company, New York, Ottawa, and San Francisco.

Taking Your Bearings (taking the guess-work out of life by means of periodic health examinations) . . . Infantile Paralysis . . . Industrial Dental Service . . . The Baby (has an index) . . . Calling All Drivers (a guide to better motoring) . . . Colds—Influenza—Pneumonia . . . Scarlet Fever . . . Sleep . . .

From the School Health Bureau comes the month by month 4 page *Health Bulletin for Teachers*, and "Supplementary Material for Use in Schools with the Motion Picture Once Upon a Time."

Plain Speaking in Pittsburgh—"Dread syphilis's greatest ally is the moral shudder that accompanies its mention." Thus speaking is *Bulletin Index*, 237 4th Ave., Pittsburgh, Pa. (March 5, 1936; *5 cents*). *B.I.* is an imitation, in form and style, of *Time* if *Time* concerned itself almost solely with local Pittsburgh news and interests. Notable and exceptional is its background and explanatory material.

Quoting a social hygiene meeting in New York:

The biggest barrier in the pathway of ad*vancement and control of these diseases*, the hygienists reiterated, was the fact that social customs taboo their discussion in the press and over the radio.

Gonorrheics and syphilitics, fearing the stigma of social pariahism, still foolishly hide themselves from doctors. Consequently, nobody knows exactly the extent of the diseases, all know that they loom as one of the biggest, toughest problems facing U. S. medicine.

A paragraph of statistics then leads into the Pittsburgh application, the local news, some local facts, and confusion as to a local project.

Probably few cities have such a truth telling medium among its periodicals published less frequently than the daily newspaper.

Health Education, Journal, February, 1936— In *American Journal of Public Health*, Feb., 1936, appeared material on health education, and material useful to those doing some form of health education.

In "Poliomyelitis in North Carolina in 1935," by Reynolds and Knox (page 97):

Since the State Board of Health is state-supported, it was felt that any information on this epidemic collected by the board was public property and, therefore, factual information was made available at all times. . . .

Conclusions: 1. That a daily bulletin, in which facts are given, inspires confidence, secures coöperation, and dispels fear.

In "Poliomyelitis in Tennessee," by Williams (page 103):

Fortunately for the public, the greatest prevalence was noted in the newspapers and practically every case occurring was commented on in more than one paper. . . .

Control measures advocated: 2. Newspaper articles in the form of general preventive measures released from time to time. An effort was made to give facts and at the same time avoid arousing public hysteria.

In "Social Significance of Industrial Medicine," by Kessler, are given suggestions for professional education

(page 162), followed by these references to lay education:

> To overcome the reduction in the life expectancy of the average worker it is desirable that preventive work be promoted. While safety education in industry has achieved a phenomenal success in the reduction of accidents, health education in industry has failed completely in making the worker conscious of any responsibility in the maintenance of his own health. The same technic that has been so successful in combating accidents, bringing the responsibility for accidents down to the lowest executive unit, the foreman, can be applied to industrial health education. It is this same technic that has made child health education successful by making the parent, the nearest executive unit, participate through the medium of Parent Teacher Associations.

" Promotion of Certified Milk (page 180) tells of a campaign launched by producers and milk commissions, information to be secured through Dr. J. A. Tobey, 350 Madison Ave., New York, N. Y.

The group of articles and the editorial (page 181) on poliomyelitis may provide valuable background material in case of another emergency.

Certainly no reader of this department of the *Journal* will fail to read " The Psychological Factors of Health Education," by Galdston (pages 171–173).

An important announcement about certain publications of the former American Child Health Association appears on page 184.

Note " End of Year Publicity " and other topics under " The Open Forum " (pages 186–189).

Under " Books and Reports " (page 199) is a review of " Socialization of Medicine" which may be useful in answering requests for debate material.

" The Dollars Saved " diagram (page 208) might be used in staff meetings, and elsewhere.

Several desirable new members of Public Health Education Section are listed on page 209.

" News from the Field ". (pages 210–214) refers to several educational campaigns.

In Newspapers and Magazines and Radio Talks—*Social Hygiene News,* 50 W. 50th St., New York, N. Y. (March, 1936; *free*), reports as follows:

> Stimulated by the favorable reception of editorial comment on medical facts revealed at the New York Regional Conference in January, the *New York Daily News* recently set a new record for social hygiene education through newspaper columns by printing for its million and a half readers a series of 4 feature articles in syphilis and gonorrhea.
>
> The text, illustrated with photographs and charts, dealt with these diseases as problems of personal hygiene and public health, stressed their dangerous communicable nature, and the necessity of securing early diagnosis and treatment if infected, described treatment, and listed sources of medical advice, and warned against quacks. A second series of 4 articles published a few weeks later, discussed preventive measures, with special reference to prophylaxis.
>
> Captain J. M. Patterson, publisher of the *News,* and Carl Warren, special writer assigned to preparation of the articles, report many congratulatory comments received from physicians and other professional persons. General public reaction has also been wholly satisfactory, as indicated by the many inquiries received by the *News,* the City Health Department, and the A.S.H.A. The articles are expected to be available shortly in reprint form.
>
> Other New York newspapers showed an equally coöperative spirit in reporting Regional Conference sessions. Increased space, accurate reporting, and a gratifying tendency to discard the ambiguous " social diseases " in favor of the scientific medical terms were apparent in leading dailies such as the *Times,* the *Herald-Tribune* and the *World-Telegram.*
>
> Encouraging, too, was the 3 column report of the Regional Conference discussions and accompanying material which appeared in *Time* magazine, issue of January 28 (p. 40). This item and the current series of articles on venereal disease in *Physical Culture Magazine* have been responsible for many additional inquiries and requests for advice, literature, and information coming into the national office.

Meanwhile, a growing disposition to coöperate in public education on social hygiene has been evidenced by the radio stations. Speaking over the N.B.C. network at the annual meeting and luncheon conference of the New York Tuberculosis and Health Association on February 25, Dr. Thomas Parran included in his talk on *Health Security* a clear-cut statement on syphilis as an enemy to health. On February 4 Dr. Snow, broadcasting from WOR on *Keeping the Doctor Away*, also used medical terms. Both of these talks were as usual approved in advance by the radio authorities. It is surely encouraging to all who have public health protection at heart to see the national networks falling in line in the campaign against syphilis and gonorrhea, in which the majority of the local stations long have joined.

In response to a wide request, Dr. Snow's talk has been mimeographed (*10 cents per copy*) and it is expected that Dr. Parran's address will also be made available.

Made by School Pupils—The construction of graphic material *by* students is a particularly good channel for the introduction of health information and ideas into the classroom. Reports of what health agencies and school people have done in this direction will always be welcome for this department.

Two pictures of exhibits are reproduced in *Journal* of National Education Assn., 1201 16th St., N.W., Washington, D. C. April, 1936. *25 cents.* One is a "rotating central display," part of a health exhibit prepared by Detroit students. The other is a glimpse of science exhibit material prepared in Stevens High School, Lancaster, Pa. The making of the latter included all the steps in the study of microscopic specimen and the making of enlarged reproductions.

Visual Education Methods and Materials—Here is a partial check list of visual education possibilities for the classroom, many of which also may be utilized with adults as we find them under varied conditions. The material for the list is found in the outline of a course for teachers, "Preparing Teachers in the Use of Visual-Sensory Aids," by W. A. Yeager:

Blackboard . . . drawings . . . Sketches . . . charts . . . graphs . . . diagrams . . . posters . . . cartoons . . . maps . . . globes . . . stereograph . . . bulletin board . . . album . . . opaque projection . . . duplicating devices . . . objects . . . sand table . . . school journey . . . field trip . . . simple dramatizations . . . puppets . . . marionettes . . . pageant . . . stereopticon . . . still film and film strip . . . slides . . . motion picture.

In *Educational Screen*, 64 E. Lake St., Chicago, Ill. March, 1936. *25 cents.*

In the same issue: "Teaching Safety Through Visual Education," by H. J. Stack. Included are "Standards for Evaluating Safety Materials," covering slides, film strips, and motion pictures.

MAGAZINE ARTICLES

"Compulsory Health Insurance." Editorial which seems to urge that the failure to give adequate medical service to millions of our population is due to "retrogression in the increasing domination of the group spirit," plus "the sacrificing of individual independence." *Saturday Evening Post.* Jan. 25, 1936.

"Hospitals in the Red." An appreciative editorial. *Saturday Evening Post.* Jan. 18, 1936.

"Open Wide," by W. C. Miller, D.D.S. *Collier's.* Mar. 14, 1936. "How to see that your children's teeth fare as well as yours, or better."

"Sensitive Souls," by H. Lees. *Collier's.* Jan. 25, 1936. "One man's meat is another man's allergen."

"A Social Worker's View on Dentistry for the Masses," by D. W. Weist. *Alumni Bulletin*, University of Illinois College of Dentistry, Medical Arts Bldg., Scranton, Pa. Sept., 1936. *35 cents.*

BOOKS AND REPORTS

Disease and Destiny—*By Ralph H. Major, M.D. New York: Appleton-Century,* 1936. 338 pp. Price, $3.50.

There is no more fascinating subject than the ruthless influence of plague and pestilence upon history. There is no subject more neglected by the professional historian, who prates of wars, conflicts, and conquest, with never a word on the romantic conquest of disease; who describes the frequently futile lives of kings, emperors, and adventurers, but overlooks the careers of scientists and sanitarians; who, more rarely, recounts the customs, commerce, and morals of peoples, but fails to mention their hygiene and sanitation. Occasionally, a great epidemic receives passing mention in one of the "standard" histories, but the author seldom realizes that such a distressing event may have altered the course of history.

In this engrossing book a medical scholar reveals the dominant rôle played by disease in the destiny of nations. In 10 interesting chapters he tells the stories of the Black Death and the devastation caused by this bubonic plague; of the destruction wrought by Jail Fever, or typhus; and of the King's Evil that scrofulous monarchs could not cure. He tells of smallpox more violent than the constant wars of the Middle Ages, of membranous croup and malaria, of leprosy and yellow fever. There is a particularly interesting section on hemophilia, or the legacy of bleeding; while the final chapter is devoted to the worst plague of all, syphilis, which afflicted, among many others, the Borgias, Francis I, Henry VIII, Nietsche, and, last but not least, Nikolay Lenin.

All this is told with colorful embellishment, and with due recognition of the plague-riders who were responsible for man's inevitable victories over most of the pestilences that have inflicted him since time immemorial. Occasionally the author attributes the death of a celebrity to a cause not recognized by most of the relatively few medical historians who have investigated the subject, as when he states that George Washington probably died of diphtheria. The best evidence seems to indicate that his death was due to a bacterial infection resulting in inflammatory swelling of the larynx and air starvation. The author also repeats the famous story of the alleged infection of Francis I with syphilis by "La Belle Ferroniere," an incident regarded by most historians as a myth, or as a canard of contemporary writers.

These mild criticisms, if they are valid, do not detract from the excellence of the book, which is a most interesting, well written, and valuable presentation of authentic facts on the profound influence of disease on history. The text is very well printed and profusely illustrated. It can be read with profit and entertainment by all health workers, and it should prove instructive and pleasing to the general reader. It is, in fact, a splendid piece of work. JAMES A. TOBEY

Doctor of the North Country—*By Earl Vinton McComb, M.D. New York: Crowell,* 1936. 238 pp. Price, $2.00.

Autobiographies are always interesting. The one before us is no exception, but contains some things which we believe might well have been omitted.

Every doctor has experiences similar to those mentioned. In a comparatively new country peopled largely by those who are the immediate descendants of immigrants, experiences are apt to be a little more raw than in older communities. One story taxes our credulity. It is hard to believe that an old woman, however stubborn, could have amputated her leg just below the knee "with a few strong snips of the scissors." How did she get through the bone?

In addition to everything else, the author was at one time Health Officer of his city, which he calls "Ourtown." In spite of the hardships described, the book closes on an optimistic note, and the author would not exchange his profession for any other in the world.

Why do so many books these days have an introduction? "Good wine needs no bush."

MAZŸCK P. RAVENEL

The Tuberculin Handbook—*By Halliday Sutherland. London: Oxford University Press*, 1936. 96 pp. Price, $2.75.

This clearly written, well printed book based on 25 years' experience, contains information for tyro and expert about the use of tuberculin in diagnosis and treatment.

When symptoms, and/or physical signs and/or radiological examination suggest the diagnosis of early pulmonary tuberculosis and tubercle bacilli have not been detected in some excretion, the tuberculin test should be used. As this occurs usually early in the disease, the author devotes 23 pages to a detailed discussion of early symptoms, physical signs and X-ray changes. All adventitious sounds and tubercle bacilli in the sputum are considered "late signs." "To sum up, none of the early symptoms, physical signs or X-ray appearances are in themselves, either singly or combined, diagnostic of pulmonary tuberculosis, and the key to their interpretation is in the tuberculin tests."

Agreement with this statement rests, of course, upon the definition of what constitutes treatable early pulmonary tuberculosis. Tuberculin tests are either generic (qualitative) or selective (quantitative), which he holds differentiates between obsolete and latent infection. Many forms of the test (he prefers the intradermic with either old tuberculin or the new purified protein derivative) are generic. If positive he gives the subcutaneous test at once. Only the subcutaneous test when it is positive to a dose of 0.005 c.c. or less of O.T. is selective and indicates activity. Therefore, all reactions to such a dose indicate treatment but not necessarily in a sanatorium; nor need the patients give up work, whereas symptoms, physical signs, or X-rays, may show such to be necessary. It is to be inferred that he treats in this way patients in whom a positive diagnosis can be made only by the tuberculin test. He leads one to infer that focal pulmonary reactions are fairly common when many others find they rarely occur. He interprets slight X-ray changes by the tuberculin reaction and the tuberculin test by the X-ray findings.

He considers tuberculin as "our greatest asset in the diagnosis and treatment of tuberculosis" of every form. He uses small doses at first, and prolonged intervals if reactions occur. He quotes Gillespie's favorable results to prove the value of tuberculin. His idea is to abolish the tuberculin sensitiveness. Nowhere does he mention that allergy and immunity may not be connected.

Full details are given about technic.

The book is readable and written apparently in a restrained manner. He does not refer to the psychological side

of the tuberculin treatment. Many no doubt wish they could share his faith in tuberculin. LAWRASON BROWN

Sanitary Law and Practice: *A Handbook on Public Health—By W. Robertson, M.D., Charles Porter, M.D., and James Fenton, M.D. (8th ed. rev.) London: The Sanitary Publishing Co., Ltd.*, 1935. 968 pp.

The new edition of this excellent work will be welcomed everywhere. The Preface of the first edition stated that it was written to meet the wants of those undergoing a systematic training preparatory to presenting themselves for examination rather than to compete with works on the theoretical aspects of public health.

As we have nothing in this country corresponding to this English system, the book will evidently be of more use from that standpoint in England than in this country. However, we have derived so much from England in the way of public health that one can study her laws, regulations and orders, and the methods of carrying them out with great profit. This book is well worth careful study by all health officers as well as others interested in public health.

The amount of study involved in getting this book together, even if we consider it only from the legal aspect, has been enormous, and speaks a great deal for the industry as well as for the masterly knowledge possessed by the authors. It will be remembered that Dr. Charles Porter is a Barrister-at-Law of the Middle Temple as well as a physician and Health Officer, and no doubt this accounts in great measure for the excellence of the book. It is still known under the name of Robertson and Porter, but for this edition, Dr. James Fenton's name appears on the title page as a co-author.

The idea must not be gotten that it is entirely a book of sanitary law, although it is an excellent reference if one wishes to study the English statutes on the many phases of public health. It is a good book on practice, and contains a tremendous amount of well written and necessary information for the health officer.

The book is excellently printed and has a large number of illustrations. The appendix gives the Housing Act of 1935. A good index adds to the value of the work. MAZŸCK P. RAVENEL

Handbook of Bacteriology—*By Joseph W. Bigger, M.D. (4th ed.) Baltimore: Wood,* 1935. 458 pp. Price, $4.25.

Not only have four editions of this excellent handbook been required in the 10 years since it first appeared, but two editions have been reprinted, and a Spanish edition has been issued, which show that the book has found a place with teachers. Bacteriology is such a rapidly growing science that even specialists find it hard to keep up with all the new things, and a well digested handbook such as this is very useful not only to teachers, but to students.

The present edition has numerous changes. According to the Preface, some two-thirds of the pages have been altered. The greatest changes concern water, diphtheria and typhoid fever. The author continues to recommend "fresh, healthy human hearts" for making the antigen for the Wassermann test. In America, these can be had almost on demand in some of our gang-ridden cities, and our frightful automobile death toll would furnish another constant source provided we were allowed to do postmortems. We cannot help wondering where a constant source of supply is found in England with its wonderfully low murder record and the few fatal motor accidents which occur.

We again find that we can recommend this book. MAZŸCK P. RAVENEL

American Sewerage Practice, Vol. III, Disposal of Sewage—*By Leonard Metcalf and Harrison P. Eddy. Revised by Harrison P. Eddy. (3rd ed.) New York: McGraw-Hill,* 1935. 836 pp. Price, $7.00.

This book deals with the theory of sewage treatment and disposal, as well as the design and operation of sewage treatment plants. Since 1916, when the second edition was published, there have been many developments in the art of sewage treatment which have spread out in so many directions that the authors found it necessary to rewrite completely a large proportion of the text of earlier editions. In making the revision, an effort has been made to devote adequate space to both older and newer processes of treatment and thus to maintain a balance which would be most helpful to readers in general; rather than to devote a relatively large proportion of space to new processes. This has resulted in an increase in the chapters from 20 in the second edition, to 33 in the third edition, without materially changing the size of the volume. The book contains 227 illustrations.

Some of the more important new features of this edition are: Chapters on the characteristics and behavior of sewage and on the pollution and self-purification of natural waters; material on skimming tanks, storm-water tanks, contact aerators and separate sludge-digestion tanks; an outline of the recent developments in chemical precipitation; three chapters devoted to the theory and operation of the activated-sludge process and the general design and details of activated-sludge plants; material on the mechanical dewatering and drying of sewage sludge and on the utilization of sludge gas; chapters on the separate treatment and disposal of industrial wastes and the operation and maintenance of sewage treatment plants; data on the costs of constructing and operating certain features of treatment plants; a bibliography in practically every chapter, listing articles and books on the subject matter of the chapter.

The death of Mr. Metcalf in 1926 left the responsibility for this new edition to Harrison P. Eddy and his associates. In the preparation of this volume, information and data were furnished by many engineers and others throughout the country.

ARTHUR P. MILLER

Introduction to Public Health—*By Harry S. Mustard, M.D. New York: Macmillan,* 1935. 250 pp. Price, $2.50.

In the *Foreword* the author states:

> It is purposely brief and does not concern itself with the details of public health administration; nor does it presume to offer suggestions for classroom or field instruction in any of the specialized phases of public health practice.

The subject-matter has been carefully selected, concisely expressed, and is accurate. Dr. Mustard has had a large experience in dealing with public health operations. The points of view presented in the various chapters are dependable, and this book should be very useful as a ready reference for public health workers.

There are 12 chapters in the book. The first deals with the background and scientific basis of hygiene and public health. Historical references to some who have made significant contributions in this important field are of interest and are stimulating.

It is unfortunate that an attempt has been made to present points of view concerning medical care as a function of public health. Inadequate consideration is given to this very difficult and perplexing problem. The author could have, with profit, made a more careful analysis as to the problem of providing more adequate medical service for all

classes of the population. This might well have been omitted.

Vital statistics and public health organization and administration are discussed in 2 chapters. Appropriate reference is made to the contributions of nonofficial and the public health agencies in administrative practice and research.

The acute infectious diseases are discussed as to causes, factors concerned in occurrence, modes of transmission, preventive measures, relative importance of periods of incubation and of communicability. Attention is called to the part which the public health nurse should play in the control of certain diseases; for example, diphtheria and tuberculosis. The place of the public health nurse in the program for the control of venereal diseases is stressed.

Two chapters are devoted to environmental sanitation and individual hygiene. Sewage disposal, water and water supplies, milk as a problem in sanitation, diseases spread through water and milk, supervision of food supplies, garbage disposal, and sanitary measures for the prevention of insect-borne diseases are considered. Ventilation is discussed with particular reference to variations of temperature and humidity in relation to human comfort and health.

Childbearing and its relation to the public health, the hygiene of infancy and young childhood, and the school health service are dealt with in an interesting and practical way in 3 consecutive chapters. These are the most constructive discussions in the book and should be exceedingly helpful to public health workers. The principal elements in a maternity hygiene program are indicated. The relation which the nurse should sustain to this phase of public health is clearly outlined.

The last chapter deals with non-communicable diseases and stresses the importance of programs for the prevention and control of cancer, heart disease, mental disease, and the relation of these activities to the general public health program.

The subject matter of this book is well arranged, clearly and effectively discussed, and its practical importance should prove suggestive and helpful in administrative procedures. It is a publication which should be particularly useful in teaching public health nurses.

There are several unfortunate mistakes in the spelling of proper names which show carelessness in publication. Otherwise, the printing is excellent.

W. S. LEATHERS

BOOKS RECEIVED

A GUIDE TO HUMAN PARASITOLOGY. FOR MEDICAL PRACTITIONERS. By D. B. Blacklock and T. Southwell. (2d ed.) Baltimore: Wood, 1935. 259 pp. Price, $4.00.

THE INTERNATIONAL LABOUR ORGANISATION AND SOCIAL INSURANCE. International Labour Office, Geneva, 1936. 219 pp. Price, $1.50.

THE SPECIFICITY OF SEROLOGICAL REACTIONS. By Karl Landsteiner. Springfield: Thomas, 1936. 178 pp. Price, $4.00.

GREAT DOCTORS OF THE NINETEENTH CENTURY. By Sir William Hale-White. Baltimore: Wood, 1935. 325 pp. Price, $5.00.

ALCOHOL: ITS EFFECTS ON MAN. By Haven Emerson. (Student's Edition.) New York: Appleton-Century. 128 pp. Price, $.80.

TUBERCULOSIS. By Gerald B. Webb. New York: Hoeber, 1936. 205 pp. Price, $2.00.

SWIMMING POOL DATA AND REFERENCE ANNUAL. Vol. IV. By Earl K. Collins, Editor. New York: Hoffman, Harris. 1936. 128 pp. Subscription, $2.00.

BIBLIOGRAPHY IN HEALTH EDUCATION FOR SCHOOLS AND COLLEGES. By Mary Ella Chayer. New York: Putnam, 1936. 100 pp. Price, $1.50.

PUBLIC HEALTH NURSING. By Mary Sewall Gardner. (3d ed. rev.) New York: Macmillan. 476 pp. Price, $3.00.

CANCER COMMISSION COMMITTEE STUDIES OF THE CALIFORNIA MEDICAL ASSOCIATION. San Francisco: Stacey, 1936. 123 pp. Price, $.75.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Vengeful Providence—Two intoxicated hunters somehow killed, cooked, and ate a rabbit, soon sickened with tularemia, and died. The moral which health educators will have to publicize seems to be: if you must hunt rabbits, hunt them sober.

AMOSS, H. L., and SPRUNT, D. H. Tularemia. J.A.M.A. 106, 13:1078 (Mar. 28), 1936.

Preventing Intranasal Infections—Picric acid in about ½ per cent dilution, instilled into the nostrils of monkeys and mice prevented intranasal infection with poliomyelitis and encephalitis viruses. The prophylactic had no injurious effect upon mice, monkeys or men.

ARMSTRONG, C., and HARRISON, W. T. Prevention of Experimental Intranasal Infection with Certain Neurotropic Viruses by Means of Chemicals Instilled into the Nostrils. Pub. Health Rep. 51, 9:203 (Feb. 28), 1936.

Path of Polio Invasion—Picric acid instilled intranasally tends to protect against intravenous (as well as intranasal) inoculation with poliomyelitis virus, thus apparently confirming the contention that intravenously introduced polio virus gains entrance to the central nervous system via the olfactory tract.

ARMSTRONG, C. Prevention of Intravenously Inoculated Poliomyelitis of Monkeys by Intranasal Instillation of Picric Acid. Pub. Health Rep. 51, 10:241 (Mar. 6), 1936.

Unto the Third Generation—Babies of mothers vaccinated in the recent past were more difficult to vaccinate successfully under the age of 4 months than were those of mothers not recently protected against smallpox. The author wonders whether continuing generations of vaccinated mothers will not finally achieve a smallpox immune people.

BENNETT, J. Parental Vaccination and Transmissible Immunity. Pub. Health, 49, 6:216 (Mar.), 1936.

Health Administration and Housing—Recounting the slow growth of the slum clearance program in Great Britain, this paper will not be very comforting to us who have only begun to scratch the surface of this difficult problem. Adequate housing is a health problem, and it behooves American sanitarians to become conversant with what others have done.

CONNAN, D. M. Public Health Administration in Bermondsley. J. State Med. 44, 3:146 (Mar.), 1936.

Ions and Influenza—This paper seems to be a discussion of the possible relationships between the H and OH ions of the blood, thunder, and influenza. This reviewer became lost in the graph showing "the alkaline tide which may markedly develop in Splanchnic Anabolics upon awakening" and never found out about the thunder.

HAMER, W. H. The Endemic Influenza Prevalence of the Three Years 1933, 1934, and 1935. J. State Med. 44, 3:125 (Mar.), 1936.

"Heart Disease" and Diseases of the Heart—Recording the fact that half the female deaths from heart disease occur after age 69 and one-third of male deaths are in the same category, the author wisely points out that "heart" deaths among the aged should not be considered in the same light as

heart disease deaths among younger groups.

HEDLEY, O. F. The Picture of Heart Disease Mortality Obtained from Vital Statistics in Washington, D. C., During 1932. Pub. Health Rep. 51, 12:285 (Mar. 20), 1936.

Municipal Sewage Disposal—Briefly reviewing the recent progress in sewage treatment, the author includes discussion of cross-connections, garbage disposal, and other topics of interest to sanitarians.

HYDE, C. G. Recent Trends in Sewerage and Sewage Treatment. Municipal Sanitation, 7, 2:44 (Feb.), 1936.

Vitamin A Deficiencies—Testing children for vitamin A deficiency by measuring their ability to adapt vision to the dark, the authors found a quarter of rural children, more than half the village group, and from half to three-quarters of the urban children (depending upon economic level) deficient in that important vitamin. Feeding vitamin A or carotene developed normal adaptability to the dark.

JEANS, P. C., and ZENTMIRE, Z. The Prevalence of Vitamin A Deficiency among Iowa Children. J.A.M.A. 106, 12:996 (Mar. 21), 1936.

Evidence Against Poliomyelitis Vaccination — Monkeys convalescing from paralytic poliomyelitis are uniformly resistant to reinfection whether or not antibodies are demonstrable in the serum, whereas monkeys vaccinated with inactivated agents remain susceptible. The findings indicate that circulating antibodies are a by-product of infection and are not correlated with resistance. The author believes that vaccination though it may affect antibody formation does not produce immunity.

JUNGEBLUT, C. W. The Mechanism of Immunity in Experimental Poliomyelitis. J. Infect. Dis. 58, 2:150 (Mar.-Apr.), 1936.

When History Was Made—Some interesting reminiscenses of the early production and use of antitoxin in this country by the man who did it.

PARK, W. H. The First Production of Diphtheria Antitoxin in the United States. Canad. Pub. Health J. 27, 3:111 (Mar.), 1936.

Scarlet Fever Prophylaxis—Ten graduated doses of scarlatinal streptococcus toxin achieve immunity with fewer and less severe reactions.

RAPPAPORT, B. Active Immunization to Scarlet Fever with Less Reaction. J.A.M.A. 106, 13:1076 (Mar. 28), 1936.

About California's Flyer in Social Medicine—Provisions of the defeated Californian health insurance bill are explained as well as their probable effect upon public health nursing. A committee will report a new bill for the consideration of the next legislature.

RUSSELL, M. E. Health Insurance in California. Pub. Health Nurs. 28, 3:148 (Mar.), 1936.

The "Kate Adams" heading toward New Orleans. This is one of the few remaining side-wheelers.

NEW ORLEANS, THE CONVENTION CITY

As New Orleans has been selected for the Annual Meeting of the American Public Health Association to be held October 20 to 23, many, no doubt, will be anxious to learn some points of interest regarding our Convention City.

New Orleans has been called by many tourists, "America's most interesting city." Interest, of course, is a subjective term, and its breadth and depth of meaning depend on personal reactions. To most people the "home town" is obviously and naturally the most interesting place in the world, but next to it there are some places which have always offered to travellers points of unusual interest. Such a place New Orleans has been for over two centuries.

What makes New Orleans deserve its title of "America's most interesting city"?

Is it its most even climate, with a summer temperature average of 78.3° F., and an average in October through March of 60.7° F.?

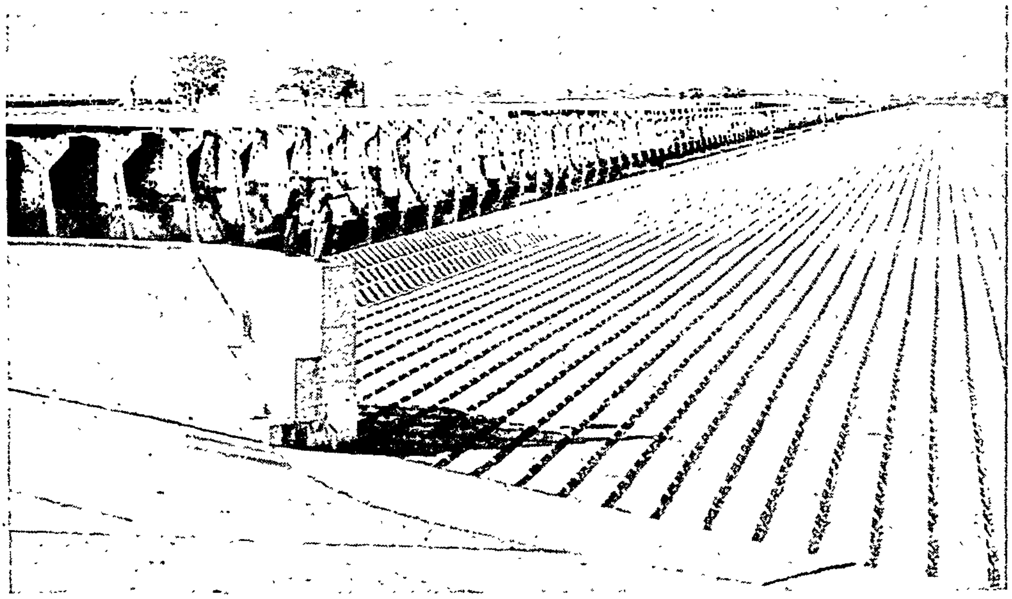
Is it its great port with a water frontage available for shipping of 133 miles, of which 50 are on the great Mississippi River and 11 on the Inner Harbor Navigation Canal?

Is it the great river itself which has a width of 2,200 feet at Canal street, in the center of the city, and a depth of 100 to 150 feet?

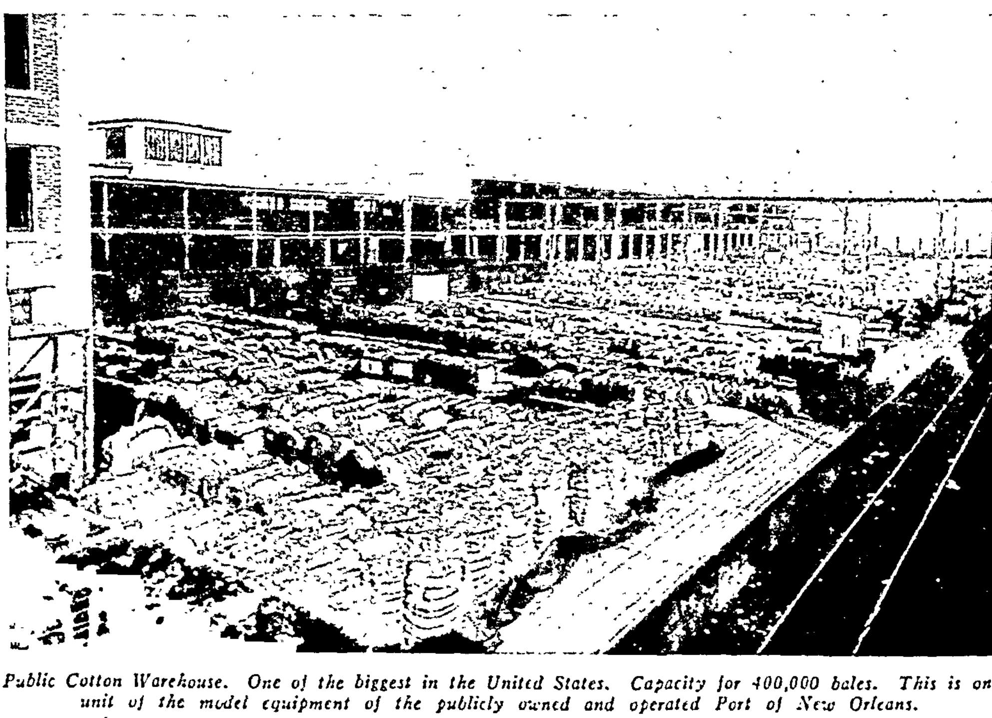
Is it the old French and Spanish section with its quaint architecture, its age, and its atmosphere of mystery and romance which steals over tourists and residents alike and charms them into willing and enthusiastic devotees of the "Vieux Carré"?

Is it perhaps the Mardi Gras which has been celebrated annually in New Orleans for over a century, and which traces its heritage from the Lupercalian feasts, well beyond the advent of the Christian era?

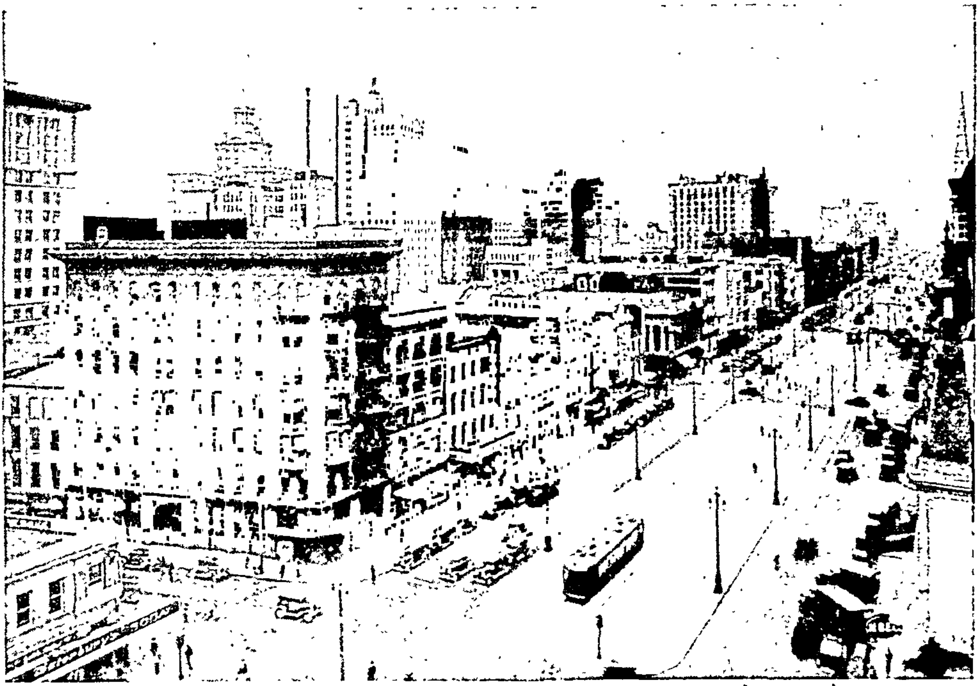
Is it perhaps the religious freedom and the remarkable tolerance to opinions and practices which characterize its people? Churches of all denominations and of varied architecture welcome the faithful. Among them are some of the most beautiful and best known in America. Of course,



The Bonnet Carre Spillway—Forever relieving New Orleans of the fear of Mississippi River floods, this great concrete by-pass—the only structure of its kind in the world—was completed in December, 1935, 30 miles above New Orleans, by the U. S. Army engineers. Its total cost was $13,000,000, including three bridges. With twice the flowage capacity of Niagara Falls, 500,000 second-feet, it will keep the water in the river at New Orleans from ever rising above the 20-foot flood level. The Spillway extends a mile and a half along the river and operates to spill the flood waters directly to sea level in Lake Pontchartrain nearby. The picture shows close-up the baffle-plates which break the force of the on-rushing waters.



Public Cotton Warehouse. One of the biggest in the United States. Capacity for 400,000 bales. This is one unit of the model equipment of the publicly owned and operated Port of New Orleans.



Canal Street, New Orleans. Five and one-half miles long, from Eads Plaza on the Mississippi River, to the Lake Front Park on Lake Pontchartrain. This street divides old and modern New Orleans.

the old St. Louis Cathedral, nearly a century and a half old, still stands, a great grey reminder of the past and pledge for the future.

Yes, it is all of these things, plus an intangible something, which is sometimes called personality but in modern parlance is so electrically and definitely described by the simple but significant word "it."

New Orleans was founded in 1718 by Bienville, the "Commandant General for the King" (Louis XIV of France), on a ridge of high land on the Mississippi, and about 115 miles from its mouth. This is the same site which is now occupied by the Vieux Carré.

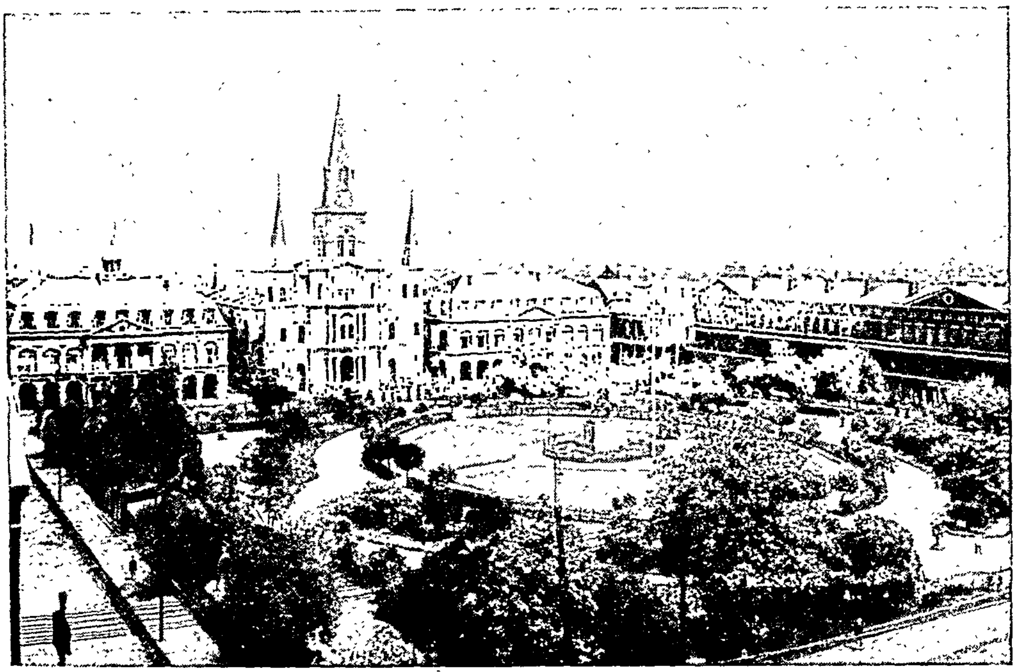
New Orleans was named after the Duke of Orleans, the regent of France and the patron of John Law and the Company of the West.

Throughout its colorful career of two and a quarter centuries, through French, Spanish, French, American, Confederate, and American domination, in succession, New Orleans has fought through periods of disease, floods, famines, war, and financial depression. In this city, in 1905, the last grand stand of civilization against the dread scourge of yellow fever was made and crowned with success.

As a direct sequel to yellow fever control, as a measure for prevention, the eradication of the Stegomyia (aedes) mosquito was imperatively necessary. The old above ground cypress cisterns, the principal breeding places of these mosquitoes, were destroyed and in their place a fine sparkling water, purified and distributed by a modern filtration plant with a capacity of over 120 million gallons a day, is furnished to the entire city.

This rapid sand filtration plant is one of the points of greatest interest to sanitarians and engineers and will be worth a visit.

To engineers, especially, and to all sanitarians in general, the sewerage

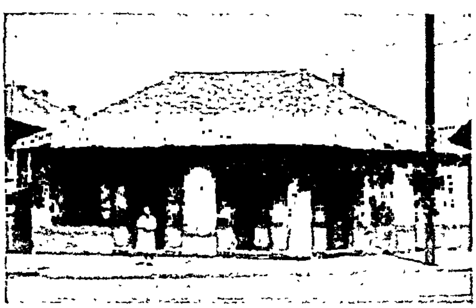


Heart of Old New Orleans. The Place d'Armes, where the Mississippi Valley development had its beginning in 1718, when New Orleans was laid out by Bienville.

Buildings left to right: Cabildo, erected in 1795 and the scene of the transfer of Louisiana from Spain to France, and from France to the United States in 1803; St. Louis Cathedral, built in 1794 on the site of Louisiana's first church; Presbytery, used originally by the Cathedral priests; Pontalba Apartment, one of the two rows of brick apartment style buildings, oldest in this country, erected by the Baroness Pontalba. In the foreground is Jackson Square where in 1769 the flag of Spain displaced that of France; the flag of France displaced that of Spain, and the American flag displaced that of France in 1803. In the center of the square is the Jackson Monument, designed by Clark Mills and unveiled in 1856.

The Cabildo and the Presbytery now house historic and natural history museums.

system will always be a source of wonder and admiration. When it is remembered that the topography of New Orleans is generally flat, and that some spots are below sea level, the difficulty from an engineering standpoint is immediately apparent. In spite of these conditions, for 36 years there has never been a serious interference with the smooth operation of the sewage disposal system.



One of the few remaining original adobe houses built of mud brick inset in cypress timbers with Spanish tile roof.

Malaria, once rampant, is now a rarity; only those cases coming from rural infection are available now for study. The elimination of malaria has been mostly due to the tremendous reclamation of land by drainage which has changed the surrounding territory from marsh lands to farm lands.

The points of particular attraction in New Orleans, to tourists as well as residents, who never tire of their charms, could easily keep one entertained for years, but even in a few days much can be seen and enjoyed.

Andrew Jackson's battlefield of Chalmette, with its monument to commemorate his victory over the heroes of Waterloo in 1815, lies just on the

edge of the city and can be reached in less than an hour.

The City Park, now one of the largest in the country, where, under the spreading oaks, many affairs of honor were settled in "ante bellum" days, is reached in 15 minutes from the hotels. Audubon Park, with its zoo, aquarium, golf links, and natural and cultivated beauty, is reached in 30 minutes from the center of the city.

Just across from the main entrance, on St. Charles Avenue, to Audubon Park are situated Tulane and Loyola Universities, beautiful in architectural arrangement and grounds, and noted centers of culture and education.

From the man-made fortifications at the end of Audubon Park, the hill-like levees, which hold the mighty Mississippi River in check, a wonderful view of this muddy torrent may be had, as it winds its tortuous way to the Gulf of Mexico.

From a tourist standpoint the old

The Spanish Arsenal, behind the Cabildo, was built by the Spanish Governor in 1770. It is architecturally one of the most distinctive buildings in the Old Quarter. It is now part of the Louisiana Historical Museum.

quarter, or the Vieux Carré, as it is affectionally called by all, is probably the greatest magnet for visitors. Here in an area of about 70 city squares are situated almost 60 spots of historic interest.

It is obviously impossible in this article to describe all the interesting spots in the Vieux Carré; indeed it would take a gifted word painter to convey even dimly the subtle charm, the hints of romance, and the reflection of deeds of valor and chivalry, that some of the age worn but still substantial monuments possess.

The Place d'Armes, now called Jackson Square, ruled over by the majestic St. Louis Cathedral, stands just back of the river banks in the center of the Vieux Carré. Flanking the Cathedral on either side are the Cabildo and the Presbytere, each of which is now used as a museum. In the Cabildo the transfer of Louisiana from France to the United States of America took place in 1803. On either side of Jackson Square the red brick Pontalba buildings, America's first apartment buildings, with their beautiful iron work railings, form a fitting framework for this beautiful section. A military air, accentuated by the famous equestrian statue of Jackson, which graces the central spot of the square, still permeates the atmosphere of this delightful and historic spot.

The old Ursulines Convent, now a parish presbytery, is just a few squares down from the Cathedral and is reputed to be the oldest building extant in the whole Mississippi Valley. It is over 200 years old.

The church of St. Anthony of Padua, known to old Creoles as the "dead church," because in yellow fever times all funerals were held there, built in 1826, is of particular interest. Just behind it lies the "old" St. Louis Cemetery, one of the best known and oldest in the United States. Here,

graves of settlers and inhabitants before the period of American domination, crumbling and time worn, still show inscriptions and constitute a never failing source of awe and interest to visitors.

The French Market, the Mint Building, the Louisiana Bank, the Bank of the United States, the Haunted House, Madame John's Legacy, and many other places are the meccas of never ending pilgrimages.

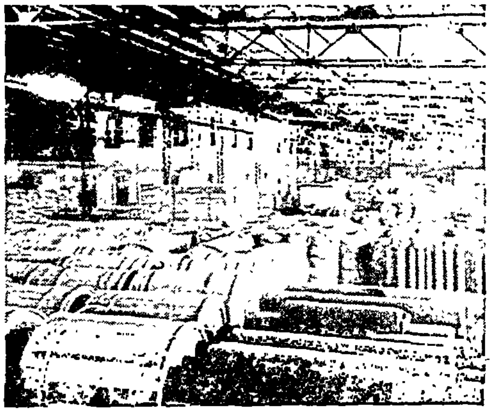
The hotels and "skyscrapers" of the modern city offer an imposing contrast to the Old Quarter. Over 3,500 first class hotel rooms are available, many air conditioned; in addition, thousands of other rooms are available.

Throughout the year, and throughout the city, beautiful flowers greet the pleased eye of the visitor. Flowers of all varieties from the humblest daisy to the proud orchid grow and thrive in New Orleans.

Above the city, a magnificent spillway, costing millions of dollars has been completed, and stands as a guarantee against any possibility of flood damage to New Orleans.

The new combined highway and railroad bridge is located just beyond the upper city lines. It cost $13,000,000 and completes a link in the Old Spanish Trail. It is the 29th bridge across the Mississippi and is the longest and finest of them all. It is toll free.

Crossing the bridge and following the old Spanish trail, within a couple of hours in an automobile or by bus, the Evangeline country, famous in poetry and prose, is comfortably reached. This is the land of the Atakapas, the land which inspired in Longfellow these lines:



Interior view of one section of a transit shed, showing the wide diversity of products handled at the Port of New Orleans

Beautiful is the land with its prairies and forest and fruit trees;
Under the feet a garden of flowers, and the blue of heavens
Bending above, and resting its dome on the walls of the forest.
They who dwell there have named it the "Eden of Louisiana."

Of course, there is not time to tell of the "year round" golfing, and boating, and fishing in the city limits of New Orleans; of the wonderful educational institutions and hospitals; of the social life—the balls, the Carnival, the racing season, the mid-winter sports carnival and many other inviting prospects for intended visitors.

New Orleans has a new commodious auditorium, one of the finest in the United States, ample for even the largest convention.

Above all, there is that indescribable "camaraderie" that natives seem born with, and new arrivals soon acquire, that makes for that atmosphere of friendliness and sociability which is an acknowledged quality of the "city care forgot," the Crescent City, New Orleans.

ASSOCIATION NEWS

AMERICAN PUBLIC HEALTH ASSOCIATION
SIXTY-FIFTH ANNUAL MEETING
NEW ORLEANS, LA.
OCTOBER 20–23, 1936

NEW ORLEANS EXECUTIVE COMMITTEE

Dr. J. M. Batchelor, Superintendent of Public Health, *General Chairman*
Dr. J. A. O'Hara, President, Louisiana State Board of Health
Dr. W. H. Seemann, State and City Bacteriologist. *Chairman, Publicity Committee*
Dr. Rigney D'Aunoy, Secretary, Medical Faculty, Louisiana State University, Medical Center. *Chairman, Scientific Exhibits Committee*
Dr. A. E. Fossier, Director, Public Health Education. *Chairman, Entertainment and Reception Committee*
J. H. O'Neill, State Sanitary Engineer. *Chairman, Meeting Rooms Committee*
Dr. W. H. Perkins, Director, Department of Preventive Medicine, Tulane Medical College.
Dr. C. C. Dauer, Assistant Professor of Preventive Medicine, Tulane Medical College. *Chairman, Registration and Information Committee*
C. L. Clay, State Analyst. *Chairman, Inspection Trips Committee*
Mrs. Charles F. Buck, Jr. *Chairman, Woman's Entertainment Committee*
Hon. A. Miles Pratt, Commissioner of Public Finances.
Dr. H. W. Kostmayer, President, Louisiana State Medical Society.
Dr. J. A. Henderson, Secretary-Treasurer and Chief Sanitary Officer, City Board of Health. *Chairman, Finance Committee. Treasurer*
Charles J. Ball, Assistant Superintendent of Public Health. *Secretary of Executive Committee*

WESTERN BRANCH A.P.H.A.

MEMBERS of the Association planning to attend the Seventh Annual Meeting of the Western Branch in Vancouver and Victoria, June 24 to 27, will be interested in the following travel information supplied by Dr. William P. Shepard, Secretary:

Vancouver may be reached by the Canadian National Railway through Winnipeg, Saskatoon, Wainright Buffalo Park, Edmonton, Jasper National Park, and the Canadian Rockies; by the Canadian Pacific by way of Winnipeg and Regina; or from Minneapolis to Moose Jaw, thence through Calgary, Banff, Lake Louise, and Rocky Mountain Park; also over the Great Northern by way of Minneapolis, Chicago, Havre, Glacier National Park, Spokane, and Everett. One may leave Minneapolis at 9:25 A.M. on a Saturday, arriving at Vancouver at 2:00 P.M. on Monday.

From Vancouver, the famous triangle tour may be taken, going by boat to Prince Rupert, just south of the Alaskan boundary, and back east by rail.

For those coming from the South, the Great Northern makes direct connections with the Southern Pacific at Portland and runs two trains a day from Seattle to Vancouver, one leaving at 8:05 A.M. and arriving at 2:00 P.M., another leaving at 5:00 P.M. and arriving at 10:15 P.M. The inter-coastal passenger steamship lines will probably be operating in June, and those who wish may enjoy an ocean voyage.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Albert L. Allen, M.D., University of North Carolina, Chapel Hill, N. C., Student—Health Officer Appointee

Franklin V. Boyd, M.D., Lake Providence, La., Director, East Carroll Parish Health Unit

George M. B. Bradshaw, M.D., Panama, N. Y., Health Officer

Irmel W. Brown, M.D., City Hall, Kalamazoo, Mich., Director of Public Health and Welfare

W. D. Burkhalter, M.D., Rockford, Ala., Coosa County Health Officer

Jose Chaves, M.D., Health Dept., San Juan, P. R., Director, Public Health Units

Isadore Cohn, M.D., 771 West End Ave., New York, N. Y., District Health Officer, New York City Dept. of Health

George R. Collins, M.D., East Main, Avon, N. Y., Health Officer

Edwin L. Crosby, M.D., 3000 Reisterstown Rd., Baltimore, Md. (temporary leave of absence), Epidemiologist-in-training, New York State Dept. of Health

Patrick H. Fleming, M.D., 311 S. Main St., St. Martinsville, La., Director, St. Martin Parish Health Unit

Frank K. Harder, M.D., City Hall, Cincinnati, O., Assistant Commissioner of Health

Walter N. Kirkman, State Dept. of Health, Baltimore, Md., Chief, Division of Personnel and Accounts

Wilbur A. McPhaul, M.D., Box 210, Jacksonville, Fla., State Health Officer

Erastus L. Miller, M.D., P. O. Box 327, Jena, La., Director, La Salle Parish Health Unit

Raymond J. Pieri, M.D., Medical Arts Bldg., Syracuse, N. Y., Health Officer, Geddes, N. Y.

Colonel Henry C. Pillsbury, M.D., Army Medical Center, Washington, D. C., Medical Corps, U. S. Army

Edwin W. Sigler, M.D., Cadiz, Ky., Director, Trigg County Health Dept.

John A. Skladowsky, M.D., City Health Dept., Baltimore, Md., Medical Health Officer

Morton Torrance, M.D., Maple St., Harpursville, N. Y., Health Officer, Colesville, N. Y.

James A. Whitaker, M.D., Rocky Mount, N. C., Health Officer

Laboratory Section

Harold A. Ansley, M.B., D.P.H., General Hospital, Hamilton, Ont., Canada, Assistant in Public Health and Pathology

Isadore R. Asen, B.S., 33 Lincoln Park, Newark, N. J., Director, Clinical Laboratory, Newark, N. J.

James Bell, M.D., Provincial Laboratory, Fort William, Ont., Canada, Director, Fort William Branch Laboratory, Ontario Dept. of Health

Silas H. Champlin, Heekin Can Co., Norwood, O., Head, Food Research

Natale Colosi, Ph.D., 308 E. 116 St., New York, N. Y., Instructor in Bacteriology, New York University, College of Medicine; Director, Colosi Pathological Laboratories

Izetta Fine, B.S., 816 Oregon Bldg., Portland, Ore., Laboratory Technician, Oregon State Hygienic Laboratory

Carlos M. Garcia, M.D., Calle J. #2, Vedado, Habana, Cuba, Special Sanitary Inspector, Havana Milk Supply

Michael Gerundo, M.D., 209 S. Main, Fort Scott, Kans., Pathologist, Mainstreet Hospital

John A. Killian, Ph.D., 50 E. 41 St., New York, N. Y., Research—biochemistry and nutrition

Moses Kopel, M.D., 1454 Grand Concourse, Bronx, N. Y., Pathologist, Gouverneur Hospital

John L. Lattimore, M.D., 618 Mills Bldg., Topeka, Kans., Director, Lattimore Laboratories

Arthur E. Potts, University of Saskatchewan, Saskatoon, Sask., Canada, Professor of Dairying

Allan C. Rankin, D.P.H., University of Alberta, Edmonton, Alta., Canada, Professor of Bacteriology and Hygiene

Winnifred C. Riddle, Faculty of Dentistry, University of Toronto, Toronto, Ont., Canada, Laboratory Assistant in Biology, Histology, Bacteriology and Pathology

Henry H. Smach, 2530 S. Ridgeland Ave., Berwyn, Ill., Chemist and Bacteriologist, Health Dept.

Manuel S. Tarpinian, 608 Kresge Bldg., Detroit, Mich., Physicians' Service Laboratory

Solomon Weintraub, M.D., 240 E. 79 St., New York, N. Y., Pathologist, Harlem Hospital

Cleveland J. White, M.D., 122 S. Michigan Ave., Chicago, Ill., Associate in Dermatology, Northwestern University Medical School

Alexander S. Wiener, M.D., 520 Crown St.,

Brooklyn, N. Y., Director of Clinical Laboratory

Giuseppe S. Zuccala, 16 Beacon Hills Rd., Port Washington, L. I., N. Y., Director, North Shore Clinical Laboratory

Vital Statistics Section

Marie Di Mario, 2704 University Ave., New York, N. Y., Assistant Supervisor of District Health Records, New York City Health Dept.

Pressley A. Kibbe, M.D., 2000 Tulane Ave., New Orleans, La., State Registrar of Vital Statistics

Manuel A. Perez, 53 Loiza St., Santurce, P. R., Chief Statistician, Health Division, Puerto Rico Reconstruction Administration

Alexander K. Powell, 209 S. Campbell St., El Paso, Tex., Registrar and Statistician, El Paso City County Health Unit

Public Health Engineering Section

John H. Barry, M.D., 2135-45 Rd., Long Island City, N. Y., Assistant Sanitary Superintendent, New York City Dept. of Health

Richard H. Bearden, 50 Morningside, New York, N. Y., Sanitary Inspector, New York City Dept. of Health

Carl J. Bernhardt, 145 Anderson Place, Buffalo, N. Y., Assistant Sanitary Engineer, State Dept. of Health

Angelo Boffi, 10130-126 St., Richmond Hill, L. I., N. Y., Sanitary Inspector, New York City Dept. of Health

James F. Brennan, 1372 Shakespeare Ave., New York, N. Y., Sanitary Inspector, New York City Dept. of Health

William C. Buntin, M.D., Dept. of Health, Staten Island, N. Y., Assistant Sanitary Superintendent

Peter J. Craig, 141-24-183 St., Springfield, L. I., N. Y., Sanitary Inspector, New York City Dept. of Health

William A. Cummings, 67 Green St., Brooklyn, N. Y., Sanitary Inspector, New York City Dept. of Health

John J. Dooley, 409 E. 88 St., New York, N. Y., Sanitary Inspector, New York City Dept. of Health

Michael F. Fitzgerald, 434 E. 67 St., New York, N. Y., Sanitary Inspector, New York City Dept. of Health

Matthew F. Greene, 9010-86 Rd., Woodhaven, L. I., N. Y., Sanitary Inspector, New York City Dept. of Health

Joseph Hardardt, 4397 Martha Ave., Bronx, N. Y., Sanitary Inspector, New York City Dept. of Health

John Heatley, 191-11 Woodhull Ave., Hollis, L. I., N. Y., Sanitary Inspector, New York City Dept. of Health

John Hertel, 1990 Ellis Ave., Bronx, N. Y., Sanitary Inspector, New York City Dept. of Health

Eugene Howard, 102 E. 238 St., Bronx, N. Y., Sanitary Inspector, New York City Dept. of Health

William S. Irving, 3543 Willett Ave., Bronx, N. Y., Sanitary Inspector, New York City Dept. of Health

Joseph M. Jenks, 89-18 146 St., Jamaica, L. I., Sanitary Inspector, New York City Dept. of Health

Peter Johnson, 2228 Amsterdam Ave., New York, N. Y., Sanitary Inspector, New York City Dept. of Health

John Kelly, 1501 Undercliff Ave., Bronx, N. Y., Sanitary Inspector, New York City Dept. of Health

William J. Kirchner, State St., Brooklyn, N. Y., Sanitary Inspector, New York City Dept. of Health

Francis J. Laverty, R.F.D. 164, Briarcliff Manor, N. Y., Assistant Sanitary Engineer, New York City Dept. of Health

Edward H. Leiber, 2113 Quimby Ave., Bronx, N. Y., Sanitary Inspector, New York City Dept. of Health

William J. Mansfield, 95-05-35 St., Jackson Heights, L. I., N. Y., Sanitary Inspector, New York City Dept. of Health

Nathaniel Milbauer, 1634 Popham Ave., Bronx, N. Y., Sanitary Inspector, New York City Dept. of Health

Fanny Z. Mitchell, R.N., 475 King Ave., City Island, N. Y., Sanitary Inspector, New York City Dept. of Health

Meron M. Mogil, 220 Boulevard, New Haven, Conn., Sewage Work, Nustone Products Corp.

James F. Morrison, M.D., 1221 Bergen St., Brooklyn, N. Y., Assistant Sanitary Superintendent, Brooklyn Division, New York City Dept. of Health

Hugh A. Newman, 530 W. 182 St., New York, N. Y., Sanitary Inspector, New York City Dept. of Health

Leroy H. Null, 138-56-223 St., Laurelton, L. I., N. Y., Sanitary Inspector, New York City Dept. of Health

William J. Plunkett, 72 Seaman Ave., New York, N. Y., Sanitary Inspector, New York City Dept. of Health

Nicholas A. Post, 59-27-69 Lane, Maspeth, L. I., N. Y., Sanitary Inspector, New York City Dept. of Health

Edwin Rasenberger, 105-05-188 St., Hollis, L. I., N. Y., Sanitary Inspector, New York City Dept. of Health

Samuel S. Reisman, 3723–18 Ave., Brooklyn, N. Y., Sanitary Inspector, New York City Dept. of Health

Ellsworth Roberts, 1864 Seventh Ave., New York, N. Y., Sanitary Inspector, New York City Dept. of Health

Arthur Rosenberg, 245–96 St., Brooklyn, N. Y., Sanitary Inspector, New York City Dept. of Health

John J. Ryan, Jr., 848 Ninth Ave., New York, N. Y., Sanitary Inspector, New York City Dept. of Health

William Sauer, 8972 Hollis Court Blvd., Queens Village, L. I., N. Y., Sanitary Inspector, New York City Dept. of Health

Conrad C. Sofleiss, 9439–120 St., Richmond Hill, N. Y., Sanitary Inspector, New York City Dept. of Health

Michael Styler, 235 Fort Washington Ave., New York, N. Y., Sanitary Inspector, New York City Dept. of Health

Fred Wasserman, 126 Manet Rd., Newton, Mass., Student, Public Health Engineering, Massachusetts Institute of Technology

William T. Winder, 2555 Mickle Ave., New York, N. Y., Sanitary Inspector, New York City Dept. of Health

Edward Wyckoff, 110 Bay 10 St., Brooklyn, N. Y., Sanitary Inspector, New York City Dept. of Health

Industrial Hygiene Section

Clarence Muehlberger, Ph.D., 222 E. Superior St., Chicago, Ill., Toxicologist, Cook County

Richard T. Page, State Dept. of Health, Charleston, W. Va., Public Health Engineer, Bureau of Industrial Hygiene

Frederick H. Shillito, M.D., 630 W. 168 St., New York, N. Y., Instructor in Medicine in Industrial Hygiene, Columbia University

Food and Nutrition Section

Eva Denzer, 157–08–92 St., Ozone Park, L. I., N. Y., Inspector of Foods, New York City Dept. of Health

Lemoyne C. Kelly, M.D., 133 E. 58 St., New York, N. Y., Assistant Physician, Bureau of Tuberculosis, New York City Dept. of Health

Child Hygiene Section

Sarah S. Deitrick, M.D., C.P.H., U. S. Dept. of Labor, Washington, D. C., Field Consultant, Children's Bureau

Adelaide R. Ross, 720 Mass Ave., Cambridge, Mass., Director of Health, Malden School Dept.

Public Health Education Section

Lindsley F. Cocheu, 205 E. 69 St., New York, N. Y., Head of Dept. of Bacteriology, Clinical Pathology, and Public Health, New York Homeopathic Medical College and Flower Hospital

A. Arthur Feller, M.D., 465 Bedford Ave., Brooklyn, N. Y., Physician in charge of Clinic, New York City Dept. of Health

Elizabeth M. Finigan, 240 S. Goodman St., Rochester, N. Y., Lecturer and Special Investigator for Children's Homes, State Dept. of Health

Dr. Victor Grossi, Bellavista 478, Valparaiso, Chile, S. A., Head of Sanitary Service of Aconqaqui

Carroll J. Roberts, M.D., 2732 Main St., Buffalo, N. Y., Clinical Director, Buffalo City Hospital

Arthur J. Strawson, 1108 Little Bldg., Boston, Mass., Executive Secretary, Massachusetts Tuberculosis League

Public Health Nursing Section

Dorothy Deming, R.N., C.P.H., 50 W. 50 St., New York, N. Y., General Director, National Organization for Public Health Nursing

Mary Lucier, 528 W. 111 St., New York, N. Y., Henry Street Nurse

Margaret E. Newman, Bewley Bldg., Lockport, N. Y., Executive Secretary, Niagara County Health Assn.

Julia B. Paluszak, St. Mary's Hospital, Passaic, N. J., Public Health Nurse

Erna M. Sohmer, R.N., 62 Tallman Ave., Nyack, N. Y., School Nurse

Epidemiology Section

John S. Douglas, M.B., D.P.H., Quarantine Station, Father Point, P. Que., Canada, Quarantine Officer, Dept. of Pensions and National Health

Unaffiliated

Howard M. Freas, M.D., 179 Dwight St., New Haven, Conn., Student

Charles E. Gill, M.D., Westfield State Sanatorium, Westfield, Mass., Senior Physician

Worth L. Howard, 525 W. Market St., Akron, O., Administrator, City Hospital of Akron

Gertrud M. C. Kroeger, 4901 Ellis Ave., Chicago, Ill., Research Assistant, Hospital Administration and Medical Economics, Julius Rosenwald Fund

Charles S. Nelson, 79 E. State St., Columbus, O., Executive Secretary, Ohio State Medical Assn.

MEETING OF THE EXECUTIVE BOARD OF THE ASSOCIATION

A MEETING of the Executive Board was held in Washington, D. C., on April 16 at the conclusion of the Conference of State and Territorial Health Officers with the Surgeon General. All members of the Board were present. Important actions were taken by the Board, among which the following may be mentioned.

Professor C.-E. A. Winslow, who since the organization of the Committee on Administrative Practice in 1920 has been Chairman, presented his resignation which was regretfully accepted by the Board. A resolution in appreciation of Professor Winslow's service to the Association is published herewith.

Eugene L. Bishop, M.D., F.A.P.H.A., and past President of the Association was made Chairman of the Committee on Administrative Practice for the duration of his present term on the committee.

The Board also received with regret the resignation of C. C. Young, D.P.H., as Chairman of the Committee on Meetings and Publications. Dr. Young has been chairman of this committee since 1929. The Board's resolution is carried on the next page.

The Board appointed the Executive Secretary as Chairman of the Committee on Meetings and Publications.

The Board adopted three resolutions which grew out of the memorandum on Authoritative Standards and Association Policy presented by Wade H. Frost, M.D., at the meeting of the Executive Board held December 19, 1935, and published in the April *Journal.*

1. It was voted that committees generally, and especially those dealing with proposed standards, be instructed to record the dissent of individual members to statements and recommendations approved by a majority and, where this affords inadequate expression, to file a minority report.

2. Voted that, with regard to proposals which pass through the Committee on Research and Standards, the Board directs that this committee as a whole or a sub-committee which takes no part in the initiation of any standards review each proposal critically from the standpoint of Association policy and, where there seems to be any probability that legitimate questions may be raised concerning the justification of the proposed standardization, arrange to have the question presented for discussion.

3. The Board directs that, with respect to reports originating in committees of the whole Association, those which propose standard procedures to be promulgated in the name of the Association be required to stand before the Association merely as proposals under consideration for a period sufficient to allow ample time for the preparation of written discussions and their publication before they are presented for action by the governing body.

The Executive Board extended a cordial invitation to the National Organization for Public Health Nursing to consider meeting with the American Public Health Association in 1937.

Robert S. Breed, Ph.D., was appointed, on recommendation of the Laboratory Section, as Association representative to the International Microbiology Congress in London beginning July 25. W. Frank Walker, Dr.P.H., was appointed Association representative to the Advisory Committee of the General Federation of Women's Clubs. The appointment of A. J. Lanza, M.D., of the Industrial Hygiene Section, as Association representative to the Conference on Silicosis and Similar Dust Diseases called by the Secretary of Labor was confirmed.

The Board approved in principle the continuation of the City Health Conservation Contest for 1936 as recommended by the Contest Committee and the Committee on Administrative Practice.

The Board directed that the Committee on Meetings and Publications

review the present status of the schedule as approved by the Governing Council for future meeting places of the Association with a view to a possible revision of this schedule.

Fiorello H. La Guardia, Mayor of the City of New York, petitioned the Board to consider the establishment of a permanent museum of hygiene exhibit following the world's fair planned for New York City. This matter was referred to the Committee on the American Museum of Hygiene.

In considering the Association budget the Board was advised of the fact that substantial additional funds had become available since the beginning of the year for the promotion of certain studies by the Sub-committee on the Evaluation of Administrative Practices and the Sub-committee on Revision of the Rural Appraisal Form. A general recasting of the Association budget for the year was necessary on this account.

The Board was advised that the financial status of the Association was reasonably satisfactory and that it was particularly encouraging to note the increase in membership as a result of efforts put forward by the Committee on Fellowship and Membership this year.

Resolutions Passed by the Executive Board at a Meeting in Washington, D. C., April 6, 1936

C.-E. A. WINSLOW

WHEREAS, Professor C.-E. A. Winslow has served as Chairman of the Committee on Administrative Practice for 15 years, and

WHEREAS, during that period which represents the committee's lifetime he has been its guide and leader, and

WHEREAS, his incalculable contribution of knowledge, enthusiasm and wisdom expended without stint throughout these years has identified the name of Winslow with public health administration for all time, therefore, be it

RESOLVED, that the Executive Board of the American Public Health Association, accepting regretfully his resignation as Chairman of the Committee, record its warm appreciation of his work and its esteem of the man; be it further

RESOLVED, that this resolution be spread upon the minutes, circulated to Professor Winslow's friends and associates and published to the membership of the American Public Health Association in the *American Journal of Public Health.*

C. C. YOUNG

The Executive Board has received with regret the resignation of Dr. C. C. Young as Chairman of the Committee on Meetings and Publications.

In accepting this resignation the Board records with appreciation the constructive services rendered to the Association by the committee under Dr. Young's leadership. During these years the Annual Meetings have been made more serviceable to the members and a new quality of financial independence has been achieved. The *Journal* has been expanded and notably improved, and similar progress has been made among all Association publications.

It is the opinion of the Board that these responsibilities could not have been better handled during this period of decentralized administration than by Dr. Young, to whom the Association will long remain deeply indebted.

NEWS FROM THE FIELD

SUMMER SCHOOL COURSES IN PUBLIC HEALTH

While the following list does not show all universities and technical schools offering summer courses in public health, it represents those who have replied to a questionnaire sent out by the American Public Health Association.

American National Red Cross

Courses in Teacher Training for Home Hygiene Instructors:

University of California, Los Angeles, Calif.—June 27–August 7
Colorado State College, Fort Collins, Colo.—July 11–August 21
University of Minnesota, Minneapolis, Minn.—June 15–July 25
Peabody College, Nashville, Tenn.—June 8–July 15
Pennsylvania State College, State College, Pa.—June 29–August 7
Syracuse University, Syracuse, N. Y.—July 6–August 15

University of California, Berkeley, Calif.

June 29–August 7

General Bacteriology
Child Development
Public Welfare Administration
Supervision in Public Health Nursing
Principles and Practice of Public Health Nursing
Introduction to Educational Psychology
Control of Poverty
Elements of Economics
General Psychology
Elementary Epidemiology *
Elementary Public Health *

* These two courses are offered in the Intersession, May 18–June 26

The Catholic University of America, Washington, D. C.

June 26–August 8

Child Study
Nursing Education
Public Health Nursing
Social Work
Sociology

Columbia University

DeLamar Institute of Public Health, College of Physicians and Surgeons, New York, N. Y.

June 8–26

School Health Supervision—Medical Inspection, Mental Hygiene, and Physical Education

(These courses will not be given unless ten candidates have signified their intention to register before May 1st.)

Teachers College, Columbia University, New York, N. Y.

July 7–August 14

Organization of Health Education in Public Schools
Child Hygiene
Health Education
Health and Physical Education
Health Care of Children
Home and Community Hygiene
Nutrition and Health
Personal and General Hygiene
Public Health Nursing
Public Health Administration
Safety Education Materials and Methods
School Nursing
Teaching Lip-Reading
Sight Saving Classes
Social Hygiene
Psychology of Exceptional (Subnormal) Children
Speech Correction
Speech Correction Clinic

When communicating with these summer schools, refer to the above announcement in the *Journal*

Cornell University, Ithaca, N. Y.

July 6–August 14

Physical Education:
- Gymnastics (Women)
- Leadership in Community Recreation Program

Health Education:
- Mental Hygiene of Childhood
- School Health Problems

University of Denver, Denver, Colo.

June 15–August 21

Social Sciences
Speech Conference

Duke University, Durham, N. C.

June 11–July 22

Materials and Methods in Health Education
Personal and School Hygiene

The University of Hawaii, Honolulu, Hawaii

June 29–August 7

Conservation of Sight
Principles of Health Education in School Hygiene

University of Illinois, Urbana, Ill.

June 15–August 8

Physical Education for Men:
- Physical Education
- Adapted Activities
- Program in Extracurricular Sports
- Curriculum in Physical Education

Physical Education for Women:
- Physical Education
- Community Recreation
- Team Sports for High School Girls
- Physical Education Program for the High School
- Methods of Teaching Health
- Principles of Body Movement

State University of Iowa, Iowa City, Iowa

June 8–August 20

Hygiene
Nursing
Nutrition
Physical Education

Massachusetts Institute of Technology, Cambridge, Mass.

June 16–July 28

Bacteriology

Medical College of Virginia, Richmond, Va.

June 15–June 27

Sixth Annual Saint Philip Hospital post-graduate clinic for Negro physicians (for physicians from all states)

Michigan State College, East Lansing, Mich.

June 22–July 31

General Bacteriology
Medical Biology Courses
Pathological Bacteriology
Personal Hygiene
Sanitary Science

University of Michigan, Ann Arbor, Mich.

June 29–August 8

School Health Problems
General Hygiene and Public Health
Child Hygiene
Public Health Nursing
Applied Nutrition
Methods and Materials in Health Education
Mental Hygiene
Case Methods in Social Treatment

University of Minnesota, Minneapolis, Minn.

June 15–July 25

Public Health

The University of New Mexico, Albuquerque, N. M.

June 9–August 1

Methods and Materials in Health Education

New York University, School of Education, Washington Square, New York, N. Y.

July 6–August 14

Principles of Public Health Nursing
Supervision in Public Health Nursing
The Teaching Activities of the Public Health Nurse

Home and Community Problems of Tuberculosis
Organization of School Nursing
Methods of Teaching for Health
Child Hygiene
Observation and Practice in Public Health Nursing
A Survey of Physical Defects in Children
Practicum in Rehabilitation of Orthopedic Cases
Adaptation of Physical-Education Activities for the Atypical Individual
Observation and Practice Teaching for Physically Handicapped
The Social Backgrounds of the School Child
Principles of Case Work in the Schools
Field Work and Family Case Work
The Psychology of Childhood
The Psychology of Adolescence

Rutgers University, New Brunswick, N. J.

June 29–August 8

Public Health

Smith College—School for Social Work, Northampton, Mass.

July 8–Sept. 2

Health and Disease
Child Development and Hygiene
Social Aspects of Medicine

Springfield College, Springfield, Mass.

June 29–August 1

Social Science and Character Education
Physical Education:
  Physiology and Physiology of Exercise
  Corrective and Therapeutic Gymnastics
  Olympic Study Tour

Stanford University, Stanford University, Calif.

June 18–August 29

Physical Education and Hygiene

Syracuse University, Syracuse, N. Y.

July 6–August 14

Public Health Nursing
Methods in Teaching Home Hygiene
Case Studies in Public Health Nursing
Mental Hygiene
Psychology
Public Speaking
Nutrition
Health Education for Classroom Teachers
Child Psychology
Public Health Administration
Social Hygiene for Public Health Nurses

University of Virginia, University, Va.

June 15–July 25 (First Term)
July 27–August 29 (Second Term)

Anatomy of the Human Nervous System
Bacteriology, Medical
Biochemistry
Education:
  Sex Character Education
  Hygiene and Sanitation
Mental Hygiene
Nursing Education:
  Curriculum in Schools of Nursing
  Supervision in Hospitals and Schools of Nursing
Institute for Doctors' Helpers

University of Washington, Seattle, Wash.

June 17–July 24 (First Term)
July 27–August 27 (Second Term)

Nutrition
Bacteriology
Physical Education Methods
Principles of Physical Education
Introduction to Public Health Nursing
Principles of Public Health Nursing
Supervision in Physical Education
Principles in Health Education
Organization and Administration of Physical Education

Washington University, St. Louis, Mo.

June 15–July 24

Sociology and Social Work
Education
Psychology
Public Speaking

Wayne University, Detroit, Mich.

June 22–August 15

Public Health Nursing in Maternity, Infancy and Preschool Services
School Nursing
Principles of Public Health Nursing
Rural and Industrial Nursing (not offered for less than 25 students)

Family Social Work (not offered for less than 25 students)
Psychology
Sociology

University of West Virginia, Morgantown, W. Va.

June 10–August 27

Playground and Community Recreation
Public School Health
Problems in Physical Education
History of Physical Education

Western Reserve University, School of Applied Social Sciences, Cleveland, Ohio

June 22–July 31

Summer Program in Public Health Nursing:
Practical Sociology
American Society
Rural Communities
Rural Government
Seminar in Rural Public Health Nursing

University of Wisconsin, Madison, Wis.

June 27–August 7

Anatomy
Bacteriology
First Aid to the Injured
Tests and Measurements in Physical Education
Health Education in Schools
Play, Recreation and Leisure Time Problems
Physical Examinations and Therapeutics
School Health and Hygiene
Physical Therapy
Effects of Physical Activity on the Body (Physiology of Exercise)

THOMAS PARRAN, JR. M.D.

THOMAS PARRAN, JR., M.D., F.A.P.H.A., took the oath of office as Surgeon General of the U. S. Public Health Service on April 6, succeeding Hugh S. Cumming, M.D., F.A.P.H.A. Dr. Parran was nominated by President Roosevelt in March, when the matter was referred to the Senate for confirmation.

DR. GODFREY NEW YORK STATE COMMISSIONER OF HEALTH

EDWARD S. GODFREY, JR., M.D., F.A.P.H.A., Assistant Commissioner of Health of New York State, was nominated on April 6 by Governor Herbert H. Lehman to succeed Thomas Parran, Jr., M.D., as State Commissioner of Health.

Dr. Godfrey was appointed a sanitary supervisor of the department in July, 1917, by Hermann M. Biggs, M.D., who was then Commissioner of Health, and he subsequently served as epidemiologist, and later as director of the division of communicable diseases, until 1931, when he was appointed director of local health administration, and 3 years later was made Assistant Commissioner of Health in charge of this bureau.

DR. FRANCIS X. MAHONEY

FRANCIS XAVIER MAHONEY, M.D., was born in Boston, Mass., July 6, 1872. He died in Boston, January 14, 1936.

After receiving his degree of M.D. at Harvard Medical School, in 1902, he continued his medical studies a year in Vienna. In 1905 he took a postgraduate course at Harvard University.

He was appointed a member of the Boston Board of Health in 1910. When the Board of Health was superseded by a Health Commissioner in 1915, Dr. Mahoney became the first Commissioner, which position he held until his death, with the exception of the period from August 1, 1918, to February 23, 1922.

Dr. Mahoney was sympathetic with efforts to bring public health officials in closer touch with the public. He established the first Health Unit in Boston in 1916, primarily to promote public education in matters relating to

health and also to secure more effective coördination between health officials and agencies designed to promote public welfare. He obtained in 1923 the approval of the Trustees of the Robert E. White Fund to utilize its income to extend further this idea, and he thus led to the creation of Boston's present chain of Health Units.

Boston's water supply was in the hands of a State Commission, but Dr. Mahoney succeeded in prohibiting the use of lead in all new water main connections in Boston. He won a long fight against commercial interests almost single-handed and drove out of Boston the traffic in old eggs for food purposes.

He was one of the first to recognize officially that changes in milk which progressively affect its nutritive properties, begin promptly, and insisted that the deterioration be delayed by keeping it at a low temperature and by lessening opportunities for bacterial contamination. His dairy inspectors were chased off farms with pitch forks and thrown off milk trains, but eventually they were considered helpful both by producers and distributors.

He contended from the first that "the only safe milk is pasteurized milk." He insisted that "certified milk" should be pasteurized. His views came to be generally recognized. From less than 30 per cent in 1910, he finally saw over 98 per cent of the milk sold in Boston pasteurized. Then came his fight in behalf of the milk consumers of Boston to preserve their right to prescribe the standard of milk which might be marketed in Boston, and to prevent such authority from being turned over for political reasons by the Legislature to political appointees without local responsibility.

Dr. Mahoney was a member of the American Medical Association, the International Health Officers' Association, the Massachusetts Medical Society, the Massachusetts Association of Boards of Health, and of the Boston Tuberculosis Association, Boston Council of Social Agencies, and Honorary President of the Boston Health League. He became a member of the American Public Health Association in 1912 and was elected to Fellowship in 1922.

DR. FLEMING AT MC GILL

DR. A. Grant Fleming, F.A.P.H.A., Director of the Department of Public Health and Preventive Medicine of McGill University, Montreal, Quebec, has been appointed Dean of the Faculty of Medicine at McGill for a 3 year period beginning September 1, 1936.

With Dr. Fleming's accession to the deanship, the Dominion of Canada will have public health men as deans of the two largest medical schools, Dr. J. G. FitzGerald, F.A.P.H.A., being Dean of the Faculty of Medicine at the University of Toronto.

DR. GARLICK

JOSEPH B. Garlick, M.D., well known physician of Schenectady, died recently in Florida following a heart attack.

Dr. Garlick had been Health Officer of the city of Schenectady on a part-time basis from 1916 to 1918. In August, 1934, he was appointed acting Commissioner of Health to fill the unexpired term of the late Dr. MacDonald, and was reappointed for a 4 year term in 1935. During his recent tenure he had taken active part in the promotion of venereal disease clinic facilities and of the pneumonia control program.

He was a member of the Pan-American Medical Society, American Medical Association, the New York State Medical Society, and the Schenectady County Medical Society of which he was a past president; and has been a member of the A.P.H.A. since 1935.

DR. ROGER PERKINS

DR. Roger Perkins, 62 years old, pathologist and bacteriologist and Professor Emeritus of Western Reserve University, died March 28 after a long illness.

He had made his home at South Kingstown, R. I., since moving in 1930 from Cleveland, O., where he had served on the faculty of Western Reserve Medical School since 1901. He had served as city bacteriologist in 1906, 1907, 1913, and 1914; and from 1914 until 1923 he was chief of the Bureau of Labor, Division of Health. He was named a trustee of the Brush Foundation in Cleveland in 1931.

During the World War Dr. Perkins served as a member of the American Red Cross Commission to Rumania, as Medical Associate to the Scientific Attache in the American Embassy in Paris, and, in 1919, as Director of the Sanitation Division of the American Red Cross Commission to the Balkan States.

He has been a member of the A.P.H.A. since 1902, a Fellow since 1922, and a Life Member since 1929.

DR. PARK

THE *Canadian Public Health Journal* for March, 1936, has an article, "The First Production of Diphtheria Antitoxin in the United States," by William H. Park, M.D., whose work in diphtheria is so well known. It is said that this record has not been previously published.

It also contains an editorial with a well deserved tribute to Dr. Park.

QUALIFICATIONS FOR NURSES

THE Minimum Qualifications for Those Appointed to Positions in Public Health Nursing have been revised by the Committee on Education of the National Organization for Public Health Nursing and the Committee on Professional Education for the next 5 year period. These revised qualifications were approved by the Governing Council of the A.P.H.A., and are now available in reprint form at the Association office.

MALARIA CONGRESS IN SPAIN

THE Third International Congress on Malaria will be held in Madrid, October 12–18, 1936, "under the high patronage of His Excellency the President of the Spanish Republic."

Dr. Gustavo Pittaluga, of Madrid, Honorary Fellow of the A.P.H.A., is *President.*

All correspondence is to be addressed to Dr. Manuel G. Ferradas, Secretary, Instituto Nacional de Sanidad, Calle de Recoletos, 19, hotel, Madrid.

ALABAMA HAS NEW HEALTH UNIT

RECENTLY a full-time health unit was set up in Coffee County, Ala., bringing the total of full-time health departments in the state to 57, leaving 10 counties without organized health service.

Dr. Henry T. Donovan, of Elba, Ala., is the Health Officer.

MISSISSIPPI HAS NEW HEALTH UNIT

THE Health Department of Marshall County, Miss., has recently been organized on a full-time basis. Dr. Vernon B. Harrison, formerly Health Officer of Coahoma County, has been appointed Health Officer of the new unit.

SILICOSIS CONFERENCE IN WASHINGTON

A CONFERENCE was called by Miss Frances Perkins, Secretary of Labor, in Washington, on April 14, on Silicosis.

The Industrial Hygiene Section of the A.P.H.A. and the Association at large were represented at the conference by A. J. Lanza, M.D., F.A.P.H.A., and Henry H. Kessler, M.D., Fellow A.P.H.A., respectively. Twelve Fel-

lows of the Section were in attendance and these names were well represented among the major committee appointments.

FLORIDA HEALTH UNIT

A PUBLIC health unit has been established in Broward County, Fla., with Dr. Paul G. Shell, formerly of Marianna, in charge. The new unit will be maintained by Lauderdale, Hollywood, and Broward Counties, their combined contribution of $5,000 to be matched by a similar amount from the state and federal governments.

Headquarters will be in Hollywood, Fla.

DEATH

MABEL LEILANI SMYTH, member A.P.H.A., of Kalihi, Hawaii, died March 31. She was President of the City County Nurses' Association, and was for the past 8 years Director of Public Health Nursing in the Board of Health of the Territory of Hawaii, and prior to that was head nurse at Palama Settlement, having been the first director of nurses at that institution.

PERSONALS

JOHN E. WORDEN, M.D., has been appointed State Health Officer of Nevada, with headquarters at Carson City, succeeding Edward E. Hamer, M.D., F.A.P.H.A.

DR. HARRY F. WILSON, member A.P.H.A., Health Officer of Dillon and Marion Counties, S. C., has been appointed Director of the Industrial Hygiene Division of the State Board of Health of South Carolina.

DR. MAURICE C. HALL, who was chief of the Zoölogical Division of the Bureau of Animal Industry, of the Department of Agriculture, Washington, D. C., has been transferred to the National Institute of Health, where he will be chief of the Division of Zoölogy.

CHARLES G. POWER, of Quebec, a lawyer and a member of Parliament at various times since 1917, has been appointed Minister of Pensions and National Health for Canada.

WILLIAM D. BURKHALTER, M.D., member A.P.H.A., of Nashville, Tenn., was recently appointed Health Officer for the newly organized Health Department of Coosa County, Ala., with headquarters at Rockford.

LORENZO L. PARKS, M.D., member A.P.H.A., of Auburn, Ala., has been appointed Health Officer of Edgecombe County, N. C.

ALONZO E. HARDISON, JR., M.D., member A.P.H.A., of Maryville, Tenn., has been appointed Director of the Blount County Health Department to succeed Dr. Owen F. Agee, resigned.

DR. DAVID T. BUNDY, of Tyler, Tex., was recently named Health Officer of Smith County, succeeding the late Dr. Benjamin T. Bryant.

DR. ROBERT E. HARPER, of Moulton, Ala., has been named Health Officer of Colbert County, succeeding Dr. George W. Warwick, of Birmingham.

DR. SAMUEL B. MCPHEETERS, of Charlotte, N. C., has been appointed Health Officer of Wayne County.

DR. MAURICE L. PETER, of Blackwell, Okla., has been appointed Health Officer of Kay County, to succeed Dr. Luther H. Becker.

DR. MARSHALL D. CARNELL, of Okmulgee, Okla., has been appointed Health Officer of Okmulgee County to succeed the late Dr. John J. C. Rembert.

DR. JOHN L. BURKHARDT, for many years City Health Officer of Big Rapids, Mich., has been appointed Postmaster.

DR. JOHN W. DARROUGH, of Everett, Wash., was recently appointed Health Officer of Everett.

DR. JOHN W. STEVENSON, of Hoquiam, has been appointed Health Officer of Grays Harbor, Wash.

CONFERENCES AND DATES

May 1, May Day–Child Health Day.

May, Food Industries Exposition, Oakland, Calif.

May 1, Annual Meeting of the Society of Illinois Bacteriologists, Allerton Club House, Chicago, Ill.

May 1–4, 60th Annual Meeting of the American Assn. on Mental Deficiency, Hotel Jefferson, St. Louis, Mo.

May 3–6, International Society for Crippled Children, St. Louis, Mo.

May 4–9, First Joint South Dakota Inter-Related Medical Meeting: State Medical Association; State Dental Association; State Veterinarians; State Nurses Association; State Hospital Association; State Pharmaceutical Association. Sioux Falls, S. D.

May 10, Mother's Day.

May 10–12, Medical Women's National Association, Kansas City, Mo.

May 11–15, American Medical Assn. Convention, Kansas City, Mo.

May 11–15, 40th Annual Convention—National Congress of Parents and Teachers, Hotel Schroeder, Milwaukee, Wis.

May 12, American Heart Association, Kansas City, Mo.

May 14–16, American Water Works Association—Pacific Northwest Section, Aberdeen, Wash.

May 19–21, Annual Conference of New York State and Local Committees on Tuberculosis and Public Health, State Charities Aid Association, Biltmore Hotel, New York, N. Y.

May 24–30, American Association of Hospital Social Workers, Atlantic City, N. J.

May 24–30, National Conference of Social Work, Ambassador Hotel, Atlantic City, N. J.

May 25, Twentieth Annual Meeting of the New York State Association of Public Health Laboratories, Vassar College, Poughkeepsie, N. Y.

May 25–27, Medical Library Association, Rochester, Minn.

May 26–30, American Society for the Hard of Hearing, Boston, Mass.

June 5, 6, Eleventh Annual Meeting of the New England Health Education Association, Massachusetts Institute of Technology, Cambridge, Mass.

June 6–Nov. 29, Medical Exhibit, "Story of Life," in Texas Centennial Exposition, Dallas, Tex.

June 8–12, Annual Convention of American Water Works Association, Hotel Biltmore, Los Angeles, Calif.

June 10, Spring Meeting of the New York State Sewage Works Association, Lido Beach, L. I., N. Y.

June 15–Aug. 21, Speech Conference, University of Denver, Denver, Colo.

June 16–18, Tenth Iowa Conference on Child Development and Parent Education, Iowa City, Iowa.

June 20–26, Canadian Medical Association, Victoria, B. C.

June 21–26, Biennial Convention of the American Nurses' Association, the National League of Nursing Education, and the National Organization for Public Health Nursing, Los Angeles, Calif. Headquarters will be, respectively: A.N.A., and N.L.N.E., Ambassador Hotel; N.O.P.H.N., Biltmore Hotel.

June 22–25, National Conference on Visual Education and Film Exhibition (DeVry Foundation). Francis W. Parker School, Chicago, Ill.

June 22–25, Annual Meeting of the National Association of Master Plumbers, Hotel Statler, Buffalo, N. Y.

June 23–25, Annual Conference of Health Officers and Public Health Nurses, Saratoga Springs, N. Y.

June 24–27, Seventh Annual Meeting, Western Branch, A.P.H.A.—meeting simultaneously with Canadian Public Health Association—Vancouver and Victoria, B. C.

June 27–July 2, National Education Association, Portland, Ore.

July, Third International Conference on Social Work Problems, London.

July 6–10, 29th Annual Meeting of the American Home Economics Association, Olympic Hotel, Seattle, Wash.

July 6–11, The Royal Sanitary Institute, Southport, England.

July 13–17, American Dental Association, San Francisco, Calif.

July 18–23, Third International Open Air School Congress, Bielefeld and Hanover, Germany.

July 25–Aug. 1, The Second International Congress of Microbiology, London.

Aug. 11–14, American Veterinary Medical Association, Deshler-Wallick Hotel, Columbus, O.

Aug. 16–22, National Hospital Association, Philadelphia, Pa.

Aug. 16–22, National Medical Association, Philadelphia, Pa.

Aug. 31–Sept. 12, Harvard Tercentenary Conference of Arts and Sciences, Cambridge, Mass.

Sept. or Oct., National Safety Council Congress, Atlantic City, N. J.

Sept. 7–10, International Union Against Tuberculosis, Lisbon, Portugal.

Sept. 14–18, New England Water Works Association, New York.

Sept. 15–30, First International Congress of Sanatoria and Private Nursing Homes; Margitsziget, Sanatorium, Budapest, Hungary.

Sept. 23–25, Annual Meeting of the New York State Association of Dairy and Milk Inspectors, Van Curler Hotel, Schenectady, N. Y.

Sept. 28–30, Public Works Conference of American Society of Municipal Engineers & International Assn. of Public Works Officials, Toronto, Ont.

Sept. 28–Oct. 2, American Hospital Association, Cleveland, O.

Oct. 10–18, National Dairy Show, Dallas, Tex.

Oct. 12–17, The Dairy Industries Exposition, Atlantic City, N. J.

Oct. 12–18, Third International Congress on Malaria, Madrid, Spain.

Oct. 17–25, Centennial Exposition Dairy Show, Atlantic City, N. J.

Oct. 20–23, Sixty-fifth Annual Meeting of the American Public Health Association, New Orleans, La. Meetings Headquarters, Municipal Auditorium; Residence Headquarters, Hotel Roosevelt.

Oct. 21–23, Ontario Hospital Association, Toronto, Ont.

Oct. 26–28, National Association of Exterminators & Fumigators, Cleveland, O.

Oct. 29–31, Annual Meeting of the Association of Military Surgeons, Detroit, Mich.

Nov. 9–12, Association of Dairy, Food and Drug Officials of the United States, Miami Biltmore Hotel, Coral Gables, Fla.

Nov. 11–13, Refrigeration Service Engineers Society, Hotel Gayoso, Memphis, Tenn.

Nov. 17–20, Southern Medical Association, Baltimore, Md.

Dec. 28–30, Society of American Bacteriologists, Indianapolis, Ind.

Dec. 28, 1936–Jan. 2, 1937, American Association for the Advancement of Science, St. Louis, Mo.

Positions Wanted

HEALTH OFFICERS

Physician, M.S.P.H. Columbia University, with experience in district health administration, desires position as health officer or in other public health administrative capacity. A-227

Man, licensed sanitary inspector and health officer in New Jersey; experience as health officer and bacteriologist, and in conducting health surveys, organizing county and state tuberculosis associations; desires administrative position in public health. A-229

LABORATORY

Man, M.Sc. University of North Dakota; experience includes several years as city and state bacteriologist and chemist; desires position in public health laboratory. L-230

Young woman, A.B. Wellesley, C.P.H. Massachusetts Institute of Technology; 1 year's research experience at Harvard School of Public Health and 1 year as technician in city health department; desires position in laboratory—preferably research. L-231

Young man, graduate Louisiana State University; 3 years in Army Medical School as a medical laboratory technician; desires position as laboratory technician in New Jersey or New York. L-232

Young woman, graduate College of Agriculture, University of Maryland; temporary employment during two summers as assistant bacteriologist in food laboratory; desires position in dairy or sanitary bacteriology. L-233

Man, M.D. University of Kentucky; several years' experience as bacteriologist in city health department and as instructor in bacteriology in a medical school; desires position as bacteriologist. L-234

Young man, M.S. University of Maryland; 1 year's experience as technician, U. S. Public Health Service; desires position as laboratory technician or junior bacteriologist. L-235

MISCELLANEOUS

Physician, M.D. Harvard; several years' experience as instructor of industrial medicine and as consultant in occupational diseases; desires position in industrial hygiene field. A-228

Epidemiologist and State Health Officer with seven years' office and field experience, available for 6 to 8 months from June 1st for special detail anywhere. Has also had extended experience in tropical medicine, parasitology, hygiene and sanitation. Is now engaged in teaching and research in Class A medical school. Graduate of Northwestern University Medical School, Liverpool School of Tropical Medicine and Hygiene; School of Hygiene and Public Health, Johns Hopkins University. 170

Man, Sc.D. Johns Hopkins School of Hygiene and Public Health; experience in teaching and research in biometry, vital statistics, physical anthropology and statistical methods, including supervision of computations and the construction of codes for punch-card tabulating systems; also editorial experience; desires position in field of vital statistics. A-236

Woman, M.S. University of Michigan; 1 year graduate study towards Ph.D., New York University; 10 years' experience including supervising physical education and instruction in health education; desires position in health education field. M-236

> Persons with medical and post-graduate education who are seeking employment are invited to communicate with the Executive Secretary in regard to several available opportunities.

Position Available

NOTICE OF EXAMINATION

The New York State Department of Civil Service will hold an examination for the position of epidemiologist in the New York State Department of Health probably some time during May, the date to be announced later. The specifications for this examination are as follows:

EPIDEMIOLOGIST, Department of Health. Appointment expected at $4,250. Duties: To make diagnoses of communicable disease cases; to investigate outbreaks and the endemic occurrence of communicable diseases; to make special studies for the purpose of improving methods for controlling these diseases; to instruct the personnel of local health departments in epidemiological procedure, and to stimulate improvement of local control measures. Candidates must be graduates of medical schools registered by the New York State Department of Education and must be registered or eligible for license and registration to practice medicine in New York State. In addition they must have completed a post-graduate course in public health of at least one scholastic year of residence, and must have had not less than one year of satisfactory experience in communicable disease control work in a city, county or state department of health or in similar organization. Subjects of examination: Written examination on the knowledge and skill involved in performing the duties, relative weight 4; training, experience and general qualifications, relative weight 6. The examination is open to non-residents of New York State.

Applications should be addressed to the Examination Division, State Department of Civil Service, Albany, New York.

> *Where no other address is given excepting the key number, address your replies to the American Journal of Public Health, 50 West 50th Street, New York City, indicating clearly the key number on the envelope. Your replies will then be forwarded.*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And The Nation's Health

Volume 26 — June, 1936 — Number 6

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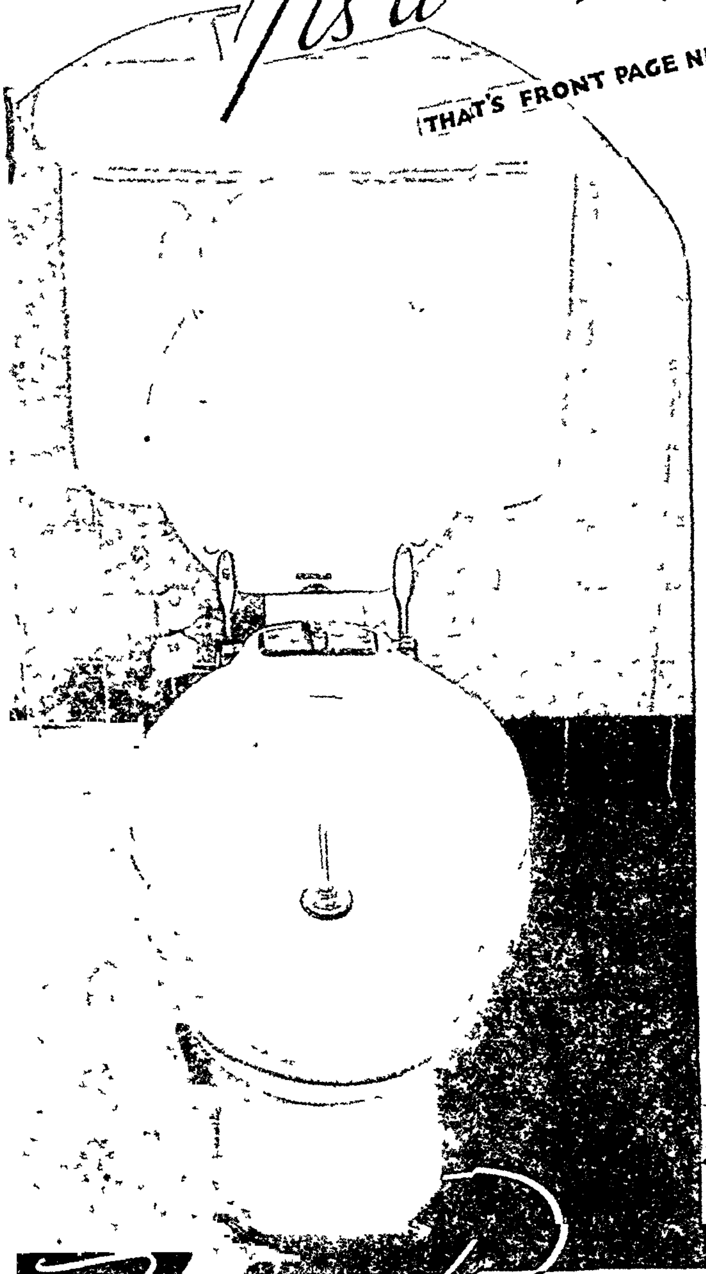

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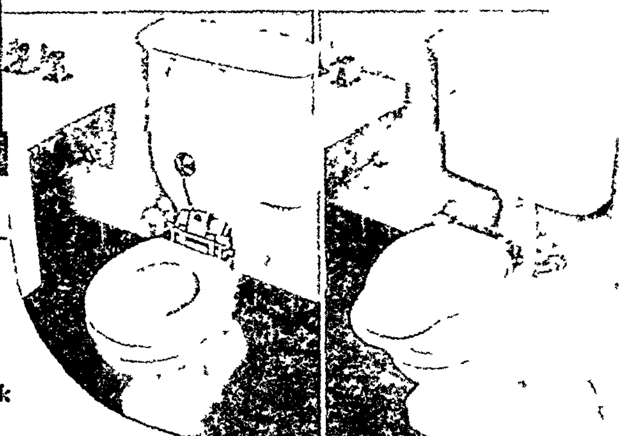

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American Journal of Public Health

and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 26 June, 1936 Number 6

CONTENTS

Continued on page vi

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Readers' Guide in your library.

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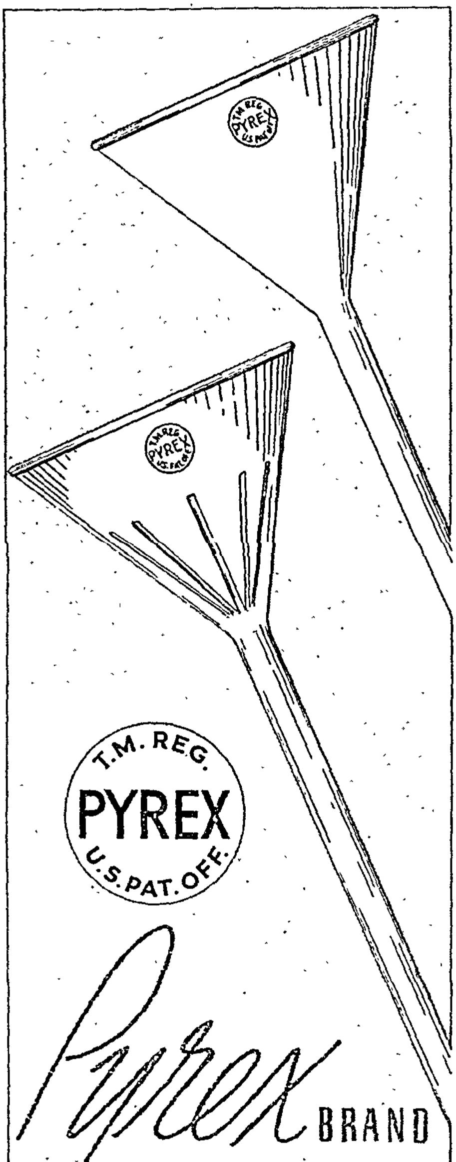
Continued on page viii



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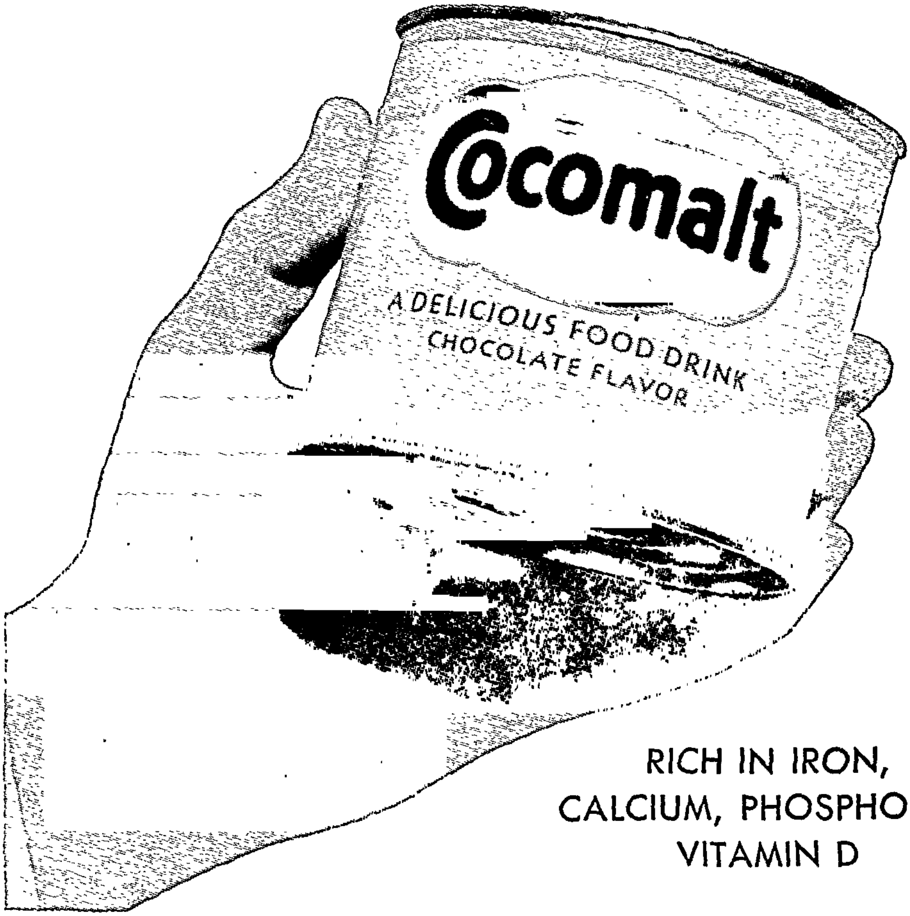
Contents—Continued PAGE

INDEX TO ADVERTISERS



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Attainable Standards in the Bacterial Counts of Raw and Pasteurized Milk*

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THE study summarized in this paper was made under the following circumstances:

The community surrounding an important state hospital had never had adequate official supervision over the milk supply. All herds in the county had been subjected to the tuberculin test, but few if any were entirely free from infection with Brucella. In fact, Brucella had been isolated from most of the raw milk examined. The commercially pasteurized milk available drew its supply from unsupervised producers, and the bacterial counts often were exceedingly high.

To meet this situation until a more adequate solution was possible, the Children's Hospital improvised a procedure, using a large water-bath to pasteurize milk in bottles. The milk thus pasteurized showed wide fluctuations in bacterial counts, and the dangers of contamination made it urgent that a modern plant be installed. A few months after the organization of a University Department of Health, it became possible to install such a plant and to carry out sanitary inspection of the producing farms as well.

The department took the position that there is not, nor can there be, any such thing as a constantly safe raw milk supply. It held further that the pasteurizing of high count raw milk, however adequate the pasteurization process, could not make such milk desirable for consumption by babies. The least that could be aimed at was Grade A raw milk which had been pasteurized.

On any strict interpretation there were no Grade A dairies in the community. The dairy from which the raw supply was then being received was better than most, but it was decidedly not entitled to a Grade A rating. It was necessary, therefore, to develop such dairies. Unfortunately, financial conditions made it impossible for the university to pay more than the prices locally paid for the higher grades of milk. The chief advantages

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* Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

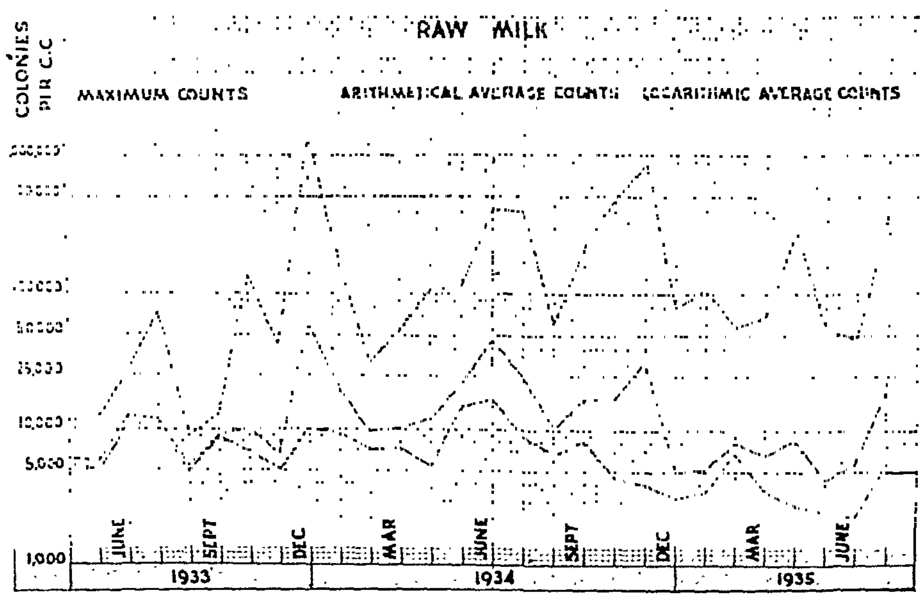
it could offer were stability of market, and freedom from surplussing.

As an example of the general conditions, one of the dairy farms which was later selected may be cited. This producer had been selling so-called Grade A raw milk in the city. On inspection the flanks of the cows were found to be caked with mud and manure, the barn floor was entirely concealed by a closely packed layer of manure several inches in depth, the walls and ceilings of the barn were heavily coated with dust-laden cobwebs, no water was available in the barn, and the milk house was in a poor state of repair. The lower portion of the barn lot was so muddy that the cows mired down if they ventured into it, and a huge accumulation of manure existed within shoveling range of the barn door. It was a grade D dairy. However, a survey showed that beneath the manure was a good concrete floor. The milk house could easily be put into good shape. The installation of water could be economically accomplished. The herd was free from tuberculin reactors, and had only 3 reactors to Brucella.

All that this dairy needed was a producer with a desire and will to remedy its defects. This producer himself said, "All I need is sanitation. If you will show me how, I will do everything required." On inquiry, it was found that he could be depended upon to fulfil his word. In spite of the extremely black picture painted by the inspector as to the requirements, this producer desired to undertake the task. These details are mentioned to show that low bacterial counts are within the reach of almost any dairy which is willing to accept such attainments as an objective. Incidentally, the dairy just described has established the best record thus far made by those in the group herein considered.

The Standard Milk Ordinance was used as a basis for the contracts, but in addition the dairies were required to carry out anything regarded as necessary by the University Department of Health. In correcting defects, first things were placed first, and unremedied

FIGURE I



defects were compensated for temporarily by more rigid efforts along other and more important lines. From the beginning, bacterial counts have been used, not for establishing grades under the ordinance but, primarily, as a means of detecting the development of mastitis and of checking upon the adequacy of the sanitary measures employed.

ATTAINABLE STANDARD FOR BACTERIAL COUNTS IN RAW MILK

Under the Standard Milk Ordinance the maximum standard for Grade A raw milk is set at a logarithmic average of 50,000 per c.c. Occasional high counts cannot be avoided, and the use of logarithmic averages provides a fair means of evaluating the total milk production. Experience over 43 months shows, however, that a logarithmic average of 50,000 is very lenient.

During this period the counts on raw milk ranged from 100 to 1,400,000 per c.c., yet the monthly logarithmic average never reached 50,000. In only 2 months did it exceed 25,000, and in only 4 months did it exceed 10,000 (Figure I). During the last 13 months the monthly logarithmic average never reached 10,000, and it exceeded 5,000 in only 4 months. Thus, a monthly logarithmic average of 5,000 per c.c. seems well within the possibility of attainment.

In this connection it is important to remember that bacterial counts are dependent upon conditions within and without the udder. The trauma which is inseparable from milking favors the development of acute or chronic mastitis and this makes it practically impossible to secure bacteria-free milk. If external conditions are completely controlled, what is the lowest bacterial range which conditions within the udder make possible?

Dorner [1] drew milk aseptically from 132 apparently healthy dairy cows and found that the bacterial counts ranged from 530 to 4,390, the arithmetical average being 2,775 per c.c. In the present studies, specimens were collected from 198 cans of milk produced by a herd of 19 cows. During the first 8 days specimens were taken daily from each can received at the plant. During the following 10 weeks, the specimens were collected weekly. Over this entire period the bacterial counts ranged from 100 to 19,000 per c.c. The arithmetical average was 1,600 and the logarithmic average 1,000 per c.c. This record was made under actual production conditions, the milk being tested as received at the plant. Consequently, it is fair to use it as a basis for determining a zone in which adverse conditions within and without the udder are operative at what is practically their lowest level. For this purpose an arithmetical count of 2,000 per c.c. has been adopted as the upper limit of the ideal zone. All counts above this level indicate a corresponding increase in the factors within or without the udder.

TABLE I

CLASSIFICATION OF BACTERIAL COUNTS IN RAW MILK

Class	*Bacterial Range*	*Interpretation*
I	Under 2,000	Ideal
II	2,000 to 4,900	Excellent
III	5,000 to 9,900	Good
IV	10,000 to 24,900	Fair: Inquiry
V	25,000 to 49,900	Something wrong: Investigate
VI	50,000 to 99,000	Poor: Investigate
VII	Over 100,000	Bad: Investigate

TABLE II

CUMULATIVE PERCENTAGE DISTRIBUTION OF RAW MILK ACCORDING TO BACTERIAL COUNTS

		Period Ending July 31			
Class	*Range of Individual Bacterial Counts*	*1932 7 Mo.*	*1933 12 Mo.*	*1934 12 Mo.*	*1935 12 Mo.*
I	Under 2,000	3.3	0.4	1.8	32.2
I–II	Under 5,000	25.5	24.9	32.8	67.9
I–III	Under 10,000	49.9	64.3	66.8	83.9
I–IV	Under 25,000	76.5	92.3	81.0	93.9
I–V	Under 50,000	84.3	95.4	90.4	97.5
I–VI	Under 100,000	87.8	98.1	95.3	98.7
VII	Over 100,000	12.2	1.9	4.7	1.3
Total specimens examined		90	261	509	1,829
Producing farms		1	1	3	3

In attaining and maintaining low bacterial counts it has been found useful to set up a classification to serve as a goal for the producers, as shown in Table I.

Bearing in mind the conditions under which this work was initiated, it is of interest to observe to what extent the producers have been able to bring their product into Groups I and II which is the goal constantly held before them. The results of 43 consecutive months ending July 31, 1935, are shown in Table II.

All specimens for examination were collected at the plant, iced, delivered to the laboratory between 10 and 11 A.M., and plated in the early afternoon. The plate method, described in *Standard Methods of Milk Analysis,* has been used exclusively. It is recognized that this method is not sufficiently accurate to measure minor deviations. Nevertheless it may be of interest to record the distribution of bacterial counts in Class I, as found in Table III.

THE USE OF MAXIMUM BACTERIAL COUNTS IN EVALUATING PASTEURIZED MILK

The Standard Milk Ordinance uses a logarithmic average of 30,000 per c.c. as a basis for classifying Grade A pasteurized milk. It should be borne in mind that pasteurization is the final factor of safety and that the milk is now ready for distribution to the consumer. There is an inconsistency involved in permitting any high count milk to slip past this final barrier. Inasmuch as the counts indicate viable organisms, it would be logical to judge pasteurized milk not by its arithmetical or logarithmic averages, but by its *maximum* bacterial counts.

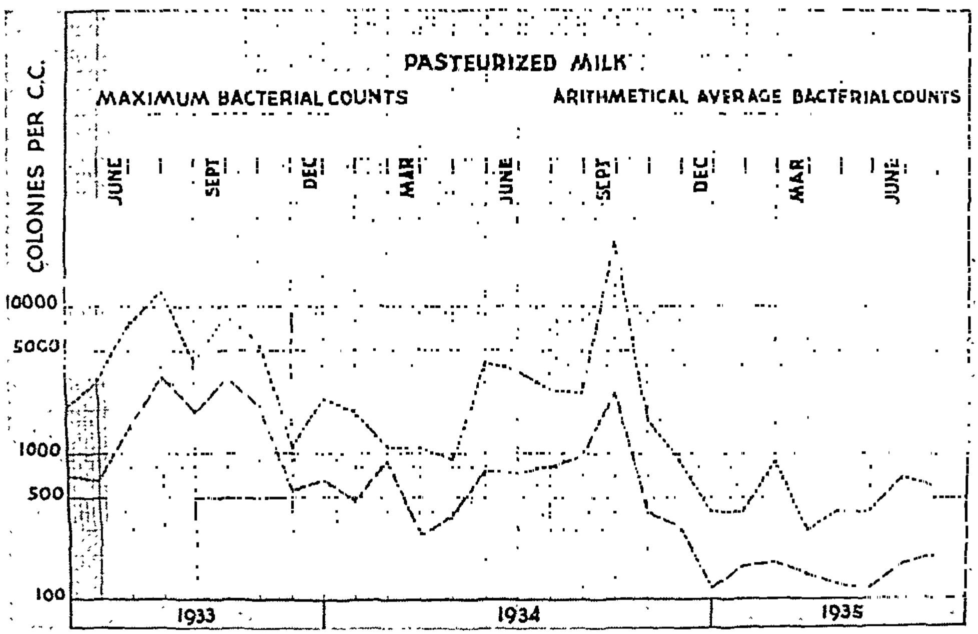
The studies herein summarized cover two periods of 15 and 28 months, respectively. During the first period, the pasteurization was done by an improvised method. The raw milk had

TABLE III

DISTRIBUTION OF BACTERIAL COUNTS BELOW 2,000 PER C.C. IN RAW MILK

Bacterial Count	*Number of Specimens*
1,000 to 1,900	412
Under 1,000	191
Total	603
900	37
800	27
700	26
600	29
500	23
400	22
300	16
200	7
100	4

FIGURE II



bacterial counts ranging from 1,000 to 690,000, the arithmetical average being 30,300 and the logarithmic average 10,000 per c.c. The pasteurized milk showed bacterial counts ranging from 100 to 118,000, the arithmetical average being 2,200 per c.c. In so far as average counts go, this was a very good record. However, 29.8 per cent of the specimens were above 5,000 in bacterial count.

During the second period of 28 months, the milk was handled in a small but modern pasteurizing plant under a well trained operator. The raw milk had bacterial counts ranging from 100 to 1,400,000, with an arithmetical average of 12,500 and a logarithmic average of 4,400 per c.c. In 1,323 specimens of pasteurized milk examined, the range of bacterial counts was from 100 to 13,000, the arithmetical average being 840 per c.c. The distribution of these counts is shown in Table IV.

Throughout the entire 28 months, the monthly arithmetical average bacterial count has exceeded 1,000 only 6 times; the highest being 3,400 per c.c. The *maximum* counts on individual specimens have exceeded 10,000 but twice, 5,000 only 5 times, and in 9 of the 28 months they have been well below 1,000 per c.c. During the final 9 consecutive months, the maximum count on any specimen has been 900, and in 5 of the 9 months has been below 500 per c.c. (Figure II). This performance has resulted practically in establishing 1,000 per c.c. as the standard for the *maximum* bacterial counts, that is, it marks the upper level of the ideal zone. If any specimens reach 2,000 per c.c. the operator and inspector try to find out what is the

TABLE IV

DISTRIBUTION OF BACTERIAL COUNTS IN PASTEURIZED MILK

Range	*Percentage of Total Specimens*
Under 300	52.4
Under 600	68.5
Under 1,000	78.0
Under 2,000	90.1
Under 5,000	97.9
Under 10,000	99.5
Under 25,000	100.0

matter. No importance is attached to such minor changes, but the only way to maintain low counts is to hold before those responsible a definite standard of excellence toward the attainment of which they may direct their efforts.

SUMMARY

This paper summarizes the studies of milk production over 43 months during which a raw milk supply was being developed under somewhat adverse conditions. Bacterial counts were used, not as a means of grading the milk but as a check upon the influence of mastitis and environmental factors. Under actual production conditions, raw milk was delivered to the plant from May 16 to July 31, with an arithmetical average bacterial count of 1,600, the individual counts ranging from 100 to 19,000 per c.c. On the basis of this performance a bacterial count of 2,000 was regarded as the upper limit of an ideal zone within which mastitis and environmental factors are reduced to the minimum. All counts in excess of this level are regarded as indicative of the operation of one or both of these factors. A classification on this basis provides a guide as to these factors and a goal for the producer. The data show that during the last 12 months, 32.2 per cent of the raw milk from 3 dairies was within this ideal zone, and 83.9 per cent was under 10,000 in bacterial count. The experience of the final 12 months indicates that a logarithmic monthly average of 5,000 seems within the possibility of attainment. The physical equipment of these dairies was such as can be developed at reasonable expense in any community.

Similar studies in pasteurized milk led to the rejection of both arithmetical and logarithmic averages, and the use of maximum bacterial counts as the criterion of excellence, 1,000 per c.c. being regarded as the upper limit of the ideal zone. The data show that this ideal zone was maintained during the final 9 months, the highest count found being 900 per c.c. During 5 of the 9 months, the maximum counts failed to exceed 500 per c.c.

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Some Epidemiological Aspects of Chronic Endemic Dental Fluorosis*

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THE endemic hypoplasia of the permanent teeth known in this country as mottled enamel was first reported by Eager[1] in 1901. The first investigation in the United States was the extensive one of Black,[2] and McKay,[3] published in 1916. At present in this country alone there are more than 200 areas where endemic mottled enamel has been confirmed by survey; in addition there are approximately 100 areas where the endemicity has been reported but not confirmed by survey. These approximate 300 areas are distributed among 23 different states.

The incidence of affection in an endemic area is relatively high, often 90 per cent, and in some instances all children exposed throughout the period of calcification of the teeth are affected. In the light of present knowledge, mottled enamel is a water-borne disease associated with the ingestion of toxic amounts of fluoride present in the water used for drinking and cooking during the period of tooth calcification. The minimal threshold has not yet been definitely established but studies to date would suggest that amounts below 1 p.p.m., expressed in terms of fluorine (F), are of no public health significance.

There is apparently no race, color, or sex differential. With respect to the teeth, the causative factor is operative only during the period of calcification, which, with the exception of the third molar represents approximately the first decade of life. There is some indication [4] that the skeletal system might likewise be affected; if this is true, it would be necessary to extend the time range to include adults.

The macroscopic pathology in the human has been classified according to severity thus: normal, questionable, very mild, mild, moderate, moderately severe, and severe. These various gradations have previously been described.[5] This classification, depending on the degree of severity of the affection, permitted in turn the development of the following "mottled enamel indexes" of a community [6, 7]: negative, border-line, slight, medium, rather marked, marked, and very marked. Several detailed studies [8, 9, 10] concerning the histopathology of this disease have been reported. An analogous hypoplasia developed under natural conditions has been observed in certain domestic animals.[11, 12] The sole hope in the solution of this problem lies in prevention. Since the ameloblasts cease functioning at the time of eruption of a tooth, such

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

ameliorative treatment as is possible is naturally very limited in scope and generally unsuccessful. Bierring[13] in referring to this disease recently has recorded that "although different in nature from typhoid fever, [it] represents a permanent physical defect of distressing character."

Mottled enamel has direct relationships to other forms of oral pathology, some of these relationships being at times paradoxical. In spite of their defective structure, mottled enamel teeth, according to McKay,[14] exhibit no greater liability to caries than do normally calcified teeth, an inference apparently sustained by the investigations of Masaki,[15] Ainsworth,[9] and Erausquin.[16] Masaki[15] and Ainsworth,[9] in addition, maintain that the eruption of the secondary dentition is delayed.

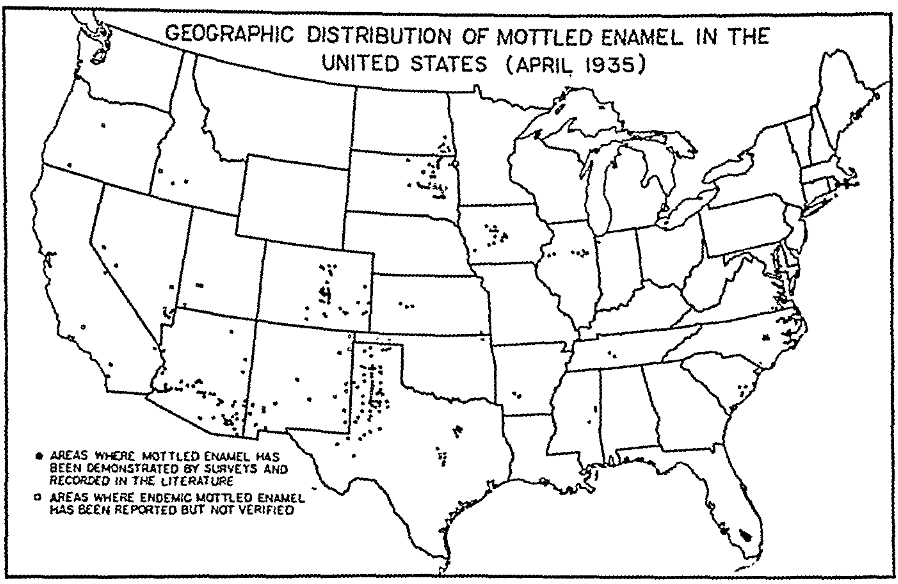
From observations made by one of us (HTD) in areas of relatively high fluoride concentration (more than 4.0 p.p.m.) there is, likewise, sufficient evidence to suggest an apparent tendency to a higher incidence of gingivitis (Figure I).

POSSIBILITY OF ERROR IN NON-QUANTITATIVE STUDIES

A review of the literature indicates that surveys of the past have been largely non-quantitative. In many instances data of little value are submitted relative to two important conditions, namely, (a) the number of children in the group studied, together with the length of time of their constant exposure, and, (b) possible changes in the chemical composition of the water used during the life period of the group examined.

The number in the group examined should consist of at least 25 children 9 years of age or older who had used the water under investigation continuously since birth for both drinking and cooking. Breaks in continuity totaling less than 30 days in any one calendar year are excepted. In instances where the examination of the first 25 children discloses an incidence of less than 75 per cent, the number in the group examined should be increased to at least 50, if possible. In other words, when more than 25 per

FIGURE I



cent are diagnosed as "normal" or "questionable," the size of the group examined should be increased to compensate for fluctuations in sampling and their possible effect on the computation of the community mottled enamel index.

Studies of the past have, in most cases, failed to take into consideration what has recently been revealed by carefully conducted surveys which included the individual water histories of each child re-checked by an interview with the child's parent. These surveys [7] have shown, at least with respect to the 9 year old group in the 4 cities studied, that only about 20 per cent used the city water continuously from birth.

The need for an adequate clinical sample is obvious when we consider that the causative factor of mottled enamel is probably operative during the entire period of calcification of the permanent teeth; and an observed effect may be the result of a comparatively low fluoride concentration operating during the entire period, or a relatively high concentration for a shorter period. In endemic areas where the domestic water contains a fluoride concentration only slightly above the minimal threshold, the production of visible signs of mottled enamel in the susceptibles of the group examined would probably depend upon the continuous use of the water during the entire period of calcification. On the other hand, in areas where the domestic water contains a comparatively high fluoride concentration, its use during a part of the period of calcification is sufficient to produce observable mottled enamel. A careful analysis of the data from the Bauxite survey [17] makes this latter point apparent.

Because of possible changes in the fluoride content of water supplies, it is obvious that an attempt to correlate clinical observations with a single fluoride determination of a municipal water associated with endemic mottled enamel introduces the possibility of questionable correlation. In respect to water from deep wells, the fact that the mineral content usually varies within comparatively narrow limits might be misleading until it has been definitely ascertained that there have been no changes in the physical set-up of the water supply during the lifetime of the children. Hence the amount of fluoride in a water sample taken at the time of the clinical examination may mean little unless a complete history of the water supply concomitant with the life of the children examined, has been obtained.

It must also be borne in mind that some municipalities using deep wells for their common water supply have more than one source of deep well water. For instance, the largest city in the United States known to be affected with mottled enamel regularly uses water from one group of wells for 6 months of the year, and from an entirely different group for the other 6 months. This rotation has been followed for the past 4 years, and since one supply has about twice as much fluoride as the other, it is evident that a single sample representing only one of these supplies would be valueless in correlating chemical findings with clinical observations. Moreover, the addition of new wells, or the abandonment of old ones during the lifetime of the group examined may introduce variable factors that would make it impossible to draw reliable conclusions from the chemical findings disclosed at the time of the examination. Furthermore, in dealing with surface waters or shallow wells, the seasonal and annual rainfall or other meteorological conditions become factors of importance. In this study, therefore, consecutive monthly water samples were obtained for 1 year and a fluoride determination was made on each sample.

TABLE I

FLUORIDE (F) CONTENT OF MONTHLY SAMPLES

(PARTS PER MILLION)

Month and Year	*Lubbock Texas*	*Amarillo Texas*	*Conway South Carolina*	*Plainview Texas*	*Mullins South Carolina*	*Big Spring Texas*
November, 1933		2.4	4.0		0.9	
December		2.5	3.9		0.9	
January, 1934	4.3	2.5	4.0	2.7	0.9	0.3
February	4.3	2.5	4.1	3.0	1.0	0.3
March	4.0	2.4	4.1	2.8	0.9	0.3
April	4.3	5.0	4.1	2.9	0.9	0.3
May	4.3	5.3	4.0	2.8	1.0	0.7
June	4.4	5.3	4.1	2.9	0.9	0.9
July	4.5	5.6	4.0	3.0	0.8	0.9
August	4.4	5.6	3.9	2.8	0.8	1.0
September	4.7	2.7*	4.1	2.9	0.9	1.1
October	4.4	5.0*	4.1	2.9	1.0	1.0
November	4.2			2.9		1.1
December	4.5			2.8		1.0
Mean annual fluoride content	4.36	3.9	4.03	2.87	0.9	0.7

* The Amarillo municipal water is obtained from two sources: October to March, inclusive, each year from the McDonald wells. April to September, inclusive, each year from the Palo Duro. In September, 1934, the city water was obtained from the McDonald supply on account of a break-down in the lines of the Palo Duro supply. In October, 1934, the water used in the city was from the Palo Duro; in November, the supply was again obtained from the McDonald wells.

PRESENT STUDY

This paper presents a comparison of the results obtained in the investigation of the following 10 cities: Monmouth and Galesburg, Ill.; Colorado Springs and Pueblo, Colo.; Lubbock, Amarillo, Plainview, and Big Spring, Tex.; and Conway and Mullins, S. C.

The detailed results, including chemical analyses, noted in the study of the Illinois and Colorado areas have been reported.[7] An approximate mottled

TABLE II

ANALYSES OF THE WATERS * USED

(PARTS PER MILLION)

	Lubbock Texas	*Amarillo Texas*	*Conway South Carolina*	*Plainview Texas*	*Mullins South Carolina*	*Big Spring Texas*
Residue on evaporation	882.0	468.0	633.1	390.0	172.0	314.0
Loss on ignition	77.0	73.7	16.6	37.0	18.2	27.0
Fixed residue	805.0	394.3	616.5	353.0	153.8	287.0
Silica (SiO_2)	64.0	51.8	17.0	62.0	43.0	19.0
Iron (Fe)	0.1	0.08	0.06	0.1	0.08	0.03
Aluminum (Al)	0.2	0.3	0.06	0.3	0.25	0.50
Calcium (Ca)	60.7	43.9	2.3	48.5	1.3	73.2
Magnesium (Mg)	72.6	47.8	0.5	35.8	0.8	6.6
Sodium and Potassium (calculated as Na)	131.4	54.1	255.1	41.9	49.3	31.1
Carbonate (CO_3)			36.0			
Bicarbonate (HCO_3)	342.8	389.2	256.0	331.8	124.2	226.9
Sulphate (SO_4)	255.0	52.0	3.4	32.5	4.3	31.9
Nitrate (NO_3)	1.0	4.4	1.0	2.2	0	4.0
Chloride (Cl)	111.8	13.5	49.5	31.8	7.9	34.0
Fluoride (F)	4.2	5.6	4.1	2.9	1.0	1.1
Phosphate (PO_4)	0	0	0	0	7.1	0
Boron (B)	0.5	0	2.5	0	0	0

* These samples of water from Lubbock, Plainview, and Big Spring were received in November, 1934; the sample from Amarillo, in August, 1934; and those from Conway and Mullins, in October, 1934. Assistant Chemist C. G. Remsburg carried out the determinations other than fluoride and boron, using mostly the methods given in the *Standard Methods of Water Analysis* of the American Public Health Association. The boron determinations were made essentially by the method of Foote.[19]

enamel index of each of the 4 Texas cities has already been reported,[6] but the chemical data are included in the present paper. Furthermore, there are included in this report, for comparative purposes, chemical findings of and certain relevant clinical observations from a recently made study in South Carolina.

The fluoride content of the monthly samples of water was estimated colorimetrically by means of the zirconium-alizarin reagent.[18] The results obtained are given in Table I.

As has been pointed out previously,[7] it may be reasonable to suppose that the mottled enamel index will be found to depend entirely on the fluoride concentration of the drinking water; but it is possible, on the other hand, that other constituents of the water may have some influence on the activity of the fluoride. For this reason it appears desirable that a careful survey of a community for chronic endemic dental fluorosis should include also, for the present at least, a chemical analysis of the drinking water for constituents other than fluoride. Results of the chemical analyses of the waters from the South Carolina and Texas cities are given in Table II.

The water histories, especially with respect to variation, and other comparative data obtained in the study of the 10 cities referred to are given in Table III.

DISCUSSION

An analysis of the history of the common water supply respecting continuity clearly indicates the extreme caution necessary in attempting to correlate clinical observations including verified water biographies, with a single fluoride determination or even an annual arithmetical mean of the fluoride content when the communal water supply itself contains one or more extrinsic variables. In more than half of the cities in the group there are sufficient interruptions to warrant caution

FIG. II

SEVERITY OF MOTTLED ENAMEL IN CHILDREN OF TEN SELECTED CITIES AND THE MEAN ANNUAL FLUORIDE (F) CONTENT OF THE MUNICIPAL WATER SUPPLY 1933-34.

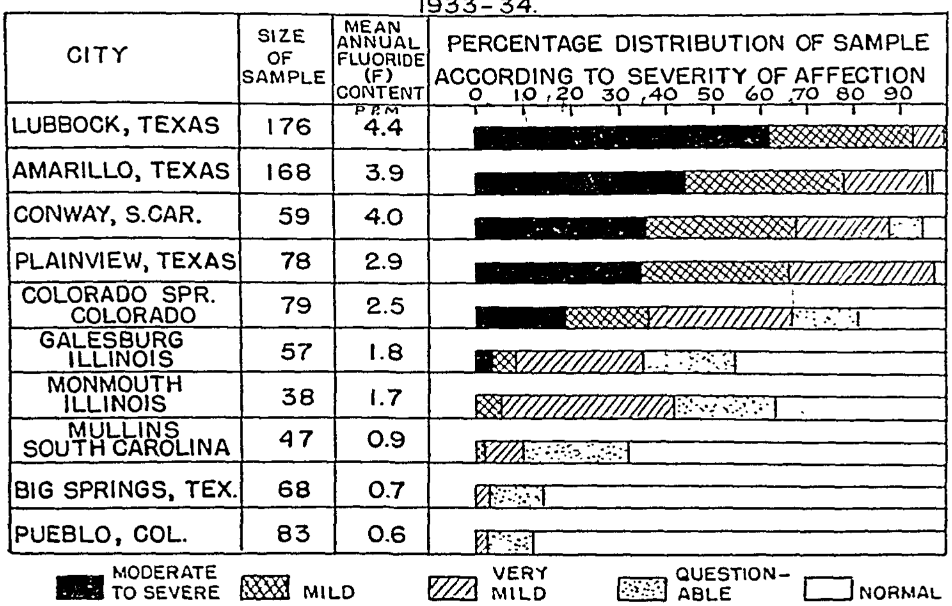


TABLE III

WATER HISTORIES AND OTHER COMPARATIVE DATA OF THE CITIES STUDIED.*

City and State	Population (1930)	Description of Water Supply with Respect to Variation	Quantitative Evaluation: Presence or absence of requisites	Quantitative Evaluation: Classification	Clinical: Age group or school grade examined	Clinical: Number of children examined who stated they had used municipal water continuously	Clinical: Number showing mottled enamel	Clinical: Incidence	Mottled enamel index of the community	Mean annual fluoride (F) content (1933–1934) (parts per million)
Colorado Springs, Colo.	33,237	Surface supply; melted snow from Pike's Peak stored in 7 mountain reservoirs 9,300′ to 12,000′ in altitude. No changes in present supply during past 20 years.	Present	A	9 year old	79	53	67.0	slight	2.5
Monmouth, Ill.	8,666	Since 1925 from two 2,445′ wells drilled to the "Potsdam" stratum of the Cambrian sandstone. Upper water-bearing strata cased off.	Present	A	9 year old	38	16	42.1	slight	1.7
Mullins, S. C.	3,158	Municipal water supply obtained from 2 deep wells, 350′ and 360′ deep and drilled in 1913 and 1921, respectively.	Present	A	9, 10, 11 years old	47	5	10.6	negative-border line	0.9
Pueblo, Colo.	50,096	Surface supply; Arkansas River. Samples taken from North Pueblo supply; clinical examinations likewise limited to children in northern half of city. North Pueblo supply from same source during past 46 years.	Present	A	9 year old	83	2	2.4	negative	0.6
Lubbock, Tex.	20,520	Municipal supply obtained from 8 wells, #1 (1925), #2 (1917), #3 and #4 (1924), #5 (1928), #6 (1930), #7 (1931), and #8 (1934). City water in general is a composite of these various wells distributed from 5 reservoirs in which water from specific wells is impounded. No. 4 well furnishes about 25% of the supply; Nos. 1, 2, 5, and 6 about 15% each, and Nos. 3, 7, and 8 about 5% each. Depth ranges from 140′ to 150′; all wells have perforated casings through each water bearing stratum. About half of the time only 2 pumps are operated and one section of the city may be served by one or two wells and another section by another well or group of wells.	Absent	B	4th 5th 6th grades	176	174	98.8	marked	4.4
Amarillo, Tex.	43,132	Prior 1927 from 35 wells, 250′ deep, located in various parts of city. In 1927 Palo Duro supply, 20 mi. SW of city consisting of 10 wells, 180′ deep, installed, and used exclusively until 1931 when McDonald supply consisting of 5 280′ wells, 7 mi. SW of city was installed. Since 1931 municipal supply from two sources: Oct.-March inclusive each year from McDonald wells; April-Sept. inclusive each year from the Palo Duro.	Absent	B	4th 5th 6th grades	168	162	96.4	rather marked	3.9

* Clinical examinations at Monmouth and Galesburg, Ill., were made during October, 1934; those of the 4 Texas cities during November, 1934, Colorado Springs and Pueblo, Colo., during April, 1935, and Mullins and Conway, S. C., during September, 1935.

TABLE III—Continued

WATER HISTORIES AND OTHER COMPARATIVE DATA OF THE CITIES STUDIED.*

City and State	Population (1930)	Description of Water Supply with Respect to Variation	Quantitative Evaluation: Presence or absence of requisites	Quantitative Evaluation: Classification	Clinical: Age group or school grade examined	Clinical: Number of children examined who stated they had used municipal water continuously	Clinical: Number showing mottled enamel	Clinical: Incidence	Mottled enamel index of the community	Mean annual fluoride (F) content (1933–1934) (parts per million)
Conway, S. C.	3,011	Municipal water supply is obtained from 3 artesian wells, a 3½" well drilled in 1896, 450' deep; a 10" well drilled in 1918, 400' deep, and a 3" well drilled in 1927, 305' deep. All wells cased entire depth. Casings of the 400' and 450' wells have "slots" at the higher water bearing levels and water from these 2 wells represents a composite of more than one water bearing stratum. About 85% of the city water is obtained from the 10" well; the remainder from the 305' well. Well drilled in 1896 supplies negligible amount. Analysis of a sample from each of the 3 wells shows slight variation in the fluoride (F) content; approximately 0.2 p.p.m.	Absent	B	9, 10, 11 years old	59	52	88.1	rather marked	4.0
Plainview, Tex.	8,834	Prior to 1926 from 2 wells, 95' and 175' deep (old supply); 1926–1928 from one well 275' deep (new supply). From 1928 to date supply is a composite one, 75% from "new" supply and 25% from "old" supply. All wells within city limits are "gravel backed" thus permitting water from different strata to mix.	Absent	B	5th 6th 7th 8th grades	78 †	76 †	97.4	rather marked	2.9
Galesburg, Ill.	28,830	Since 1928 from 2 2,414' wells drilled to the "Potsdam" stratum of the Cambrian sandstone. During 1924–1928, 60% of municipal supply from first 2,414' well and 40% from 2 wells in St. Peters sandstone, 1,245' and 1,252' deep.	Absent	B	9 year old	57	20	35.1	slight	1.8
Big Spring, Tex.	13,735	Municipal supply obtained from 23 wells. One-third of supply from 13 wells, 260' deep drilled in 1923. Two-thirds of supply from 8 wells, 280–300' deep, drilled in 1927. During 1894–1923 all municipal water from "Old Park" supply, which was supplemented until 1927 by 1923 group of wells. During 1927–1933, "Old Park" supply shut down. Between Nov., 1933, and May, 1934, 1927 group of wells also shut down. Wells located 2, 6, and 9 miles, respectively, south of Big Spring.	Absent	B	5th 6th grades	68	2	2.9	negative	0.7

* Clinical examinations at Monmouth and Galesburg, Ill., were made during October, 1934; those of the 4 Texas cities during November, 1934, Colorado Springs and Pueblo, Colo., during April, 1935, and Mullins and Conway, S. C., during September, 1935.

† Large part of 1934 sample calcified their teeth while using "old" water supply, the "F" content of which is unknown. Recent survey (March, 1936) shows incidence of 87.6 and index of "medium."

in attempting to correlate clinical observations with the composition of the water at the time of the clinical survey.

The application of epidemiological principles for the purpose of determining a minimal threshold of toxicity produced under natural conditions presupposes that inferences shall not be drawn from studies of cities in which there is an interfering relevant variable in one or both of the factors which are to be correlated. The magnitude of the population of these 10 cities makes possible a clinical examination of a sufficiently large sample in each community having the essential characteristic of continuously using a common water supply for domestic purposes. But when an attempt is made to correlate the mottled enamel index of the community with the mean annual fluoride content, only 4 of the cities are appropriate for quantitative evaluation; in the others, an approximate evaluation only is possible.

With respect to an adequate clinical sample, it has been found desirable, if not necessary, in instances where the examination of the first 25 children discloses an incidence of less than 75 per cent, to increase the minimal number of the group, whenever possible, to at least 50. In other words, when more than 25 per cent are diagnosed "normal" or "questionable," the increase in the number examined naturally tends to compensate for the fluctuation in sampling and its corresponding influence on the computation of the community mottled enamel index.

The data obtained in the study of these 10 cities and the fact that many reports in the literature generally omit inherent basic data required for epidemiological purposes suggest the classification of endemic areas under three heads:

Class A—Communities where the requisites for a quantitative evaluation are present and have been analyzed

Class B—Communities where changes in the source of water supply and/or population preclude quantitative evaluation. In some instances, however, a careful analysis of the variable factor or factors may suggest an approximate evaluation

Class C—Communities which have been reported in the literature as affected with chronic endemic dental fluorosis (mottled enamel) but where the requisites for a quantitative evaluation were not stated.

In this study, Colorado Springs, Colo.; Monmouth, Ill.; Mullins, S. C., and Pueblo, Colo., are illustrative of Class A. Lubbock and Amarillo, Tex.; Conway, S. C.; Plainview, Tex.; Galesburg, Ill., and Big Spring, Tex., would come under Class B. A high percentage of endemic areas previously reported in the literature would be classified under C.

SUMMARY

1. The requisites for a quantitative evaluation of an area showing chronic endemic dental fluorosis (mottled enamel) are: (a) a common water supply whose history discloses no relevant changes in either its physical set-up or its source during the period concomitant with the life of the group examined; and (b) clinical examinations, the observations recorded quantitatively, of a minimum of 25 children, 9 years of age or over, who have used a common water supply continuously since birth for both drinking and cooking. Breaks in continuity totaling less than 30 days in any one calendar year are excepted. Moreover, in instances where the examination of the first 25 children discloses an incidence of less than 75 per cent, an attempt should be made to increase the number of children to 50 or more in order to compensate for fluctuation in sampling.

2. For the purpose of quantitative study, affected communities are classified on the basis of the presence or absence of the requisites for quantitative evaluation, as follows: Class A in-

cludes communities where the requisites for a quantitative evaluation are present and have been analyzed; Class B includes those where changes in source of water supplies and/or population make impossible the determination of a quantitative evaluation; and Class C includes communities which have been reported as affected with mottled enamel without stating whether the requisites for a quantitative evaluation are present or absent.

3. The percentage distribution of severity permits the computation of an actual or approximate "mottled enamel index" of an affected area. This index in turn may be correlated with the fluoride content of the water supply, expressed as an arithmetical mean of 12 consecutive monthly determinations.

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Whooping Cough in Surveyed Communities*

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AS it is chiefly in the light of a definitely ascertained incidence that the relative importance of various modes of spread may be determined and the effectiveness of various control measures gauged, the basic question in the epidemiology of any disease is the determination of its incidence. In the case of the acute communicable diseases of childhood, a number of factors have directed attention away from incidence determinations. Among such factors could be mentioned the variable prevalence over short periods of time, the general reliance upon mortality to the exclusion of morbidity data, the inadequacy of the information furnished in many of the diseases by notification, and the cost of obtaining complete reports.

The present data are the results of field work in several communities in the United States under the auspices of the U. S. Public Health Service in collaboration with the Milbank Memorial Fund. The method is essentially that of a periodic canvass of a representative sample of white families in a stated area and the recording of pertinent data on interval illnesses—in the present instance, on attacks of whooping cough. Where a physician had seen the case, his diagnosis was obtained. At the start of each survey, the date of birth, sex, and previous history of whooping cough were recorded for each person; and similar data, together with the date of entrance, are recorded for each new arrival in the population under observation. All departures through change of residence and also deaths are recorded so that the number of persons under observation is known.

Two general types of survey are included in the present report. The first, which will be styled "local survey," was performed by essentially the same well trained field staff in 3 different localities—Cattaraugus County, N. Y., Hagerstown, Md., and Syracuse, N. Y. It will be noted that these represent 3 widely differing types of community. Cattaraugus is predominantly rural, with a very small village population, Hagerstown is a small city of some 30,000 persons, and Syracuse a relatively large one of approximately 200,000 inhabitants.

The second or "general survey" was the study conducted by the research staff of the Committee on the Costs of Medical Care, from which the whooping cough data have been made available through the kindness of Selwyn D. Collins, of the U. S. Public Health

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

† Deceased.

TABLE I

DATE, DURATION, AND NUMBER OF PERSONS OBSERVED FOR SPECIFIED SURVEYS

Community	*Date of Survey*	*Duration of Survey in Months*	*Average Number of Persons Observed*
Local Surveys			
Cattaraugus County Rural Area, N. Y.	1929–1932	36	4,940
Hagerstown, Md.	1922, 1923	28	7,079
Syracuse, N. Y.	1930, 1931	18	4,962
General Survey, Costs of Medical Care			
Rural	1928–1931	12 *	7,825
Towns and Villages less than 5,000	" "	"	8,964
Towns and Cities 5,000–100,000	" "	"	10,942
Cities Over 100,000	" "	"	15,240

* Although the period of observation of any one community was only 12 months, the field work in the several communities included in each category was spread over a period of 40 months.

Service, with which the committee's morbidity records were deposited for further analysis. This was a large survey performed in 18 states in various types of community and including some 9,000 white families. Unlike the local studies, the field staff for this survey was not previously trained in morbidity surveys, and varied in each of the many localities in which the work was performed. These factors gave rise to some uncertainty when the question of using the Costs of Medical Care data was considered, but it will be seen that the general survey rather strikingly confirms the local surveys, and that its figures have a more truly average value by virtue of the distribution of the field work in numerous areas, and over a period of years.

The local survey populations were much more representative of the population of the communities in which the studies were made, as the general survey of the Committee on the Costs of Medical Care included primarily families of 2 or more persons. The special characteristics of the latter populations and methods of collecting data have been outlined by Collins.[1] The essential point is, however, that both types of survey include fairly large populations accurately determined, and that the cases of whooping cough occurring in them during more or less prolonged periods of observation have likewise been quite accurately recorded. The size of the populations studied, the date, and the duration are given for each survey in Table I.

This report will make use only of the information obtained from these studies on: (1) case fatality, (2) histories of attack, and (3) attacks of whooping cough during the period of observation. The data obtained in the 3 categories will be compared and certain deductions as to the incidence of whooping cough will be made.

CASE FATALITY

In Table II have been assembled the cases and deaths recorded for the surveys embraced in this report. It will

TABLE II

CASES, DEATHS, AND CASE FATALITY FOR SPECIFIED SURVEYS

	Cases	*Deaths*	*Case Fatality Per Cent*
Cattaraugus 1929–1932	280	None	....
Hagerstown (Survey) 1922, 1923	374	None	....
" (whole city) 1922, 1923	(1,538)	(3)	0.20
Syracuse 1930–1931	93	None	....
Costs of Medical Care 1929–1933	841	3	0.36
All Surveys	1,588	3	0.19

be noted that no deaths were observed in the 3 local surveys, Cattaraugus, Hagerstown, and Syracuse, although 3 whooping cough deaths, all in persons not included in the survey, were registered for Hagerstown during this period. When the rates for whooping cough in the sample population were applied to the total white population of this small city, a total of 1,538 cases was obtained, the case fatality being 0.20 per cent. The case fatality of 0.36 per cent for the Costs of Medical Care survey was somewhat higher. It is seen to be based, likewise, upon a very small number of deaths, so that chance variations in the latter could affect it markedly. However, there is a certain amount of evidence which would indicate that the observed rate is typical. At Dr. Collins's suggestion, the mean age-specific whooping cough mortality rates for white persons in the registration area in 1930–1931 were applied to the person-years of observation of the Costs of Medical Care Study, and the figure of 3.2 deaths so obtained tallies closely with the observed number.

The figures for whooping cough case fatality based upon notified cases and registered deaths commonly show a considerably higher rate even when the factor of incompleteness of reporting is controlled. This raises the question of whether there may not be a fairly high proportion of cases of chronic bronchitis included in the survey series of cases. As only about 50 to 70 per cent of the cases were attended by physicians, it was not always possible to obtain a medical confirmation of the diagnosis. The lay criterion for whooping cough is based chiefly upon the crowing inspiration which follows the attacks. It is therefore felt that the majority of these non-attended cases were actually overt whooping cough and that, if anything, they represent an under- rather than an overstatement.

Confirming these low survey figures, several indirect measurements of case fatality are to be found in the literature. Henderson [2] obtained the figure 0.2 per cent for London, Ontario, from data based upon histories of attack among children under 20 years of age, and Sydenstricker and Collins,[3] from histories of illness and of death in Cattaraugus, obtained an estimate of 0.33 per cent. Using somewhat the same method as Henderson, Collins [4] estimated the case fatality in children under 15 years of age at 0.54 per cent for the United States as a whole.

In the 5 year period 1929–1933, there occurred among white persons in the United States Registration Area an average of 4,500 deaths yearly from whooping cough. This probably represents a minimum, as it is generally felt that an undetermined number of deaths from whooping cough each year is listed under pneumonia. If whooping cough were a disease with a high case fatality, this would not imply a very great prevalence, but the case fatality is evidently not high. If the figure obtained from the Costs of Medical Care study, which is intermediate in relation to these various estimates, be taken as fairly reliable, the average of 4,500 deaths in the registration area represents 1,250,000 cases annually among white persons in that area. This method of estimating the number of cases has numerous limitations, but it at least shows in a general way the extremely high prevalence of the disease.

INCIDENCE

In obtaining incidence rates for whooping cough and many other illnesses, 3 general sources of data may be used: (1) reported cases, (2) recorded histories of attack, (3) recorded cases by morbidity survey.

That useful information may be obtained from analysis of reported cases

has been shown by Godfrey.[5] However, the fact that only about half of all cases are seen by physicians, and that but a small proportion of those so seen are reported, makes the data in this country seem of doubtful value when general incidence figures are to be obtained. In Scotland, Laing and Hay[6] and in England, Stocks[7] have published valuable studies of general incidence in cities, but the question still remains of how fully notification is achieved or, in the case of Stocks's work, of how completely it has been possible to allow for unreported cases.

It would appear that recording the percentages of individuals with a remembered history of prior attack of whooping cough, as has been done in this country by Henderson, Collins, Lombard, Scamman, Doering, and others, offers extremely useful data on prevalence. It is open to the objections that the incidence may have changed in recent years and that the memories of persons giving the histories may be fallible, but on the whole the data so obtained reflect surprisingly accurately the prevalence within the period covered and the method of collection is relatively inexpensive.

The data obtained by morbidity survey are perhaps the most complete if the survey is extensive enough and if it covers a sufficiently long time so that epidemic influences are controlled. When, as in the case of the surveys here reported, history data are combined with observations on current attacks, it is believed that a very definite picture of the incidence may be secured. The incidence measured in both cases is only that of overt attacks of whooping cough.*

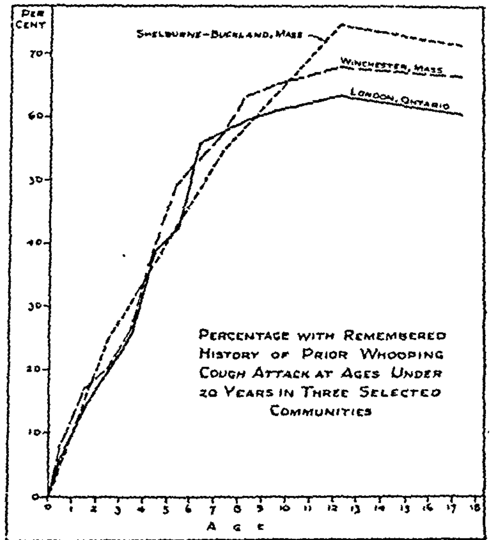

FIGURE I

It is proposed first to outline briefly the information obtained by recording the per cent at each age with remembered history of attack prior to the beginning of the surveys. In *Figure I* are shown curves giving these percentages for 3 communities recorded in the literature: Shelburne-Buckland, Mass., reported by Lombard and Scamman,[8] Winchester, Mass., reported by Scamman and Doering,[9] and London, Ontario, reported by Henderson.[2] Shelburne-Buckland represents a rural township population, Winchester a town of some 11,000 persons, and London, Ontario, a city of about 40,000 population. They are all on the same parallel of north latitude, a point which may be important, as there is some evidence that southern communities in this country show higher percentages with history of previous attack. The curves have been plotted only to 20 years of age, as histories are unreliable at older ages.

It will be noted that the more rural Shelburne-Buckland curve reaches a higher level, although it climbs somewhat more slowly. The level is about 75 per cent. The Winchester curve falls between the former and the Lon-

* There is a good deal of evidence that overt attacks are only one factor in immunization against whooping cough. Stocks (*loc. cit.*) has postulated a transient immunity in individuals exposed but not overtly attacked, and one other possible factor of a more permanent nature.

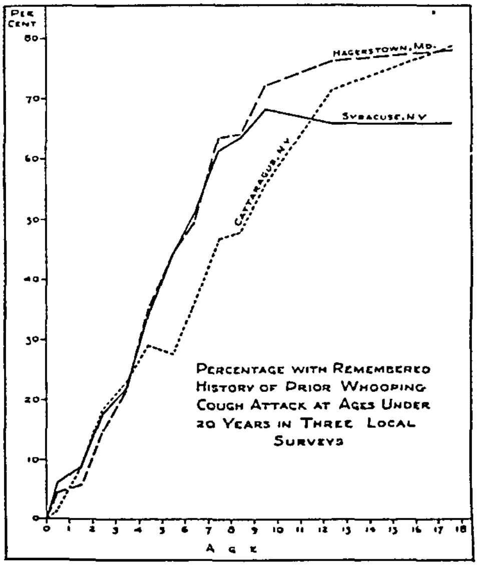

FIGURE II

don, Ontario, curve, the last reaching a level at about 64 per cent.

Figure II shows this same phenomenon for the 3 local surveys of Cattaraugus, N. Y., Hagerstown, Md., and Syracuse, N. Y. Here there is a definite difference between the levels reached by the rural and the large city groups, but the Hagerstown curve, which theoretically should lie between, actually reaches essentially the same level as the rural curve. This may be due to the possibility, mentioned above, that more southerly placed communities tend to show larger percentages.

Figure III shows this same data for the communities of varying size in the Costs of Medical Care study.

It will be noted in general that the curve for rural areas tends to rise *somewhat more slowly, and that at 18* years of age it may still be rising, whereas the corresponding urban curves reach a somewhat lower level at 13 years of age or less. Translated into terms of incidence, this means that the smaller communities tend to have a lower attack rate at the earlier ages, and a higher one in the later years, and that they show a higher general incidence at ages under 20 years. This translation in statistical terms can be made quite accurately from these very curves, as Henderson and Collins have shown. Thus an average annual incidence below a given age can be obtained by dividing the percentage with prior history at the given age by the number of years from birth to that age. The figure would be the per cent attacked annually, and this multiplied by 10 would be average annual attack rate per 1,000. A rate so obtained would be, in a sense, standardized for age. It will be noted, however, that some of the curves shown in Figures I–III do not approach an asymptote but actually decline after age 15. There is good reason for believing that this is not due to a lower prevalence of whooping cough 15 or 20 years before the survey, but is an artefact dependent upon the inability of some informants to remember attacks occurring many years before. In obtaining by the above method the average annual incidence rates under the age of 20, entitled " Rates from history record cumula-

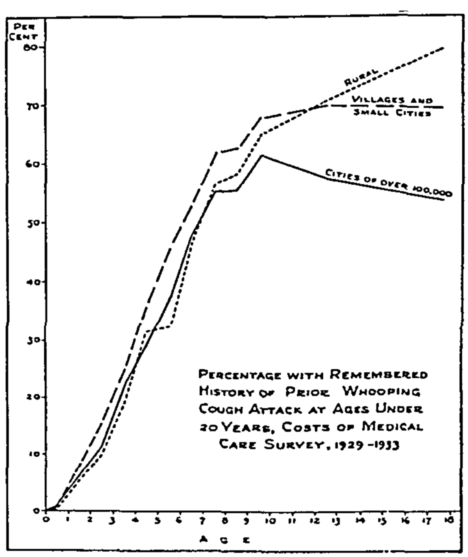

FIGURE III

TABLE III

ANNUAL WHOOPING COUGH RATES PER 1,000 OBSERVED IN SPECIFIED SURVEYS

	1. Local Surveys			2. General Survey, Costs of Medical Care				
	Cattaraugus	*Hagerstown*	*Syracuse*	*Rural*	*Villages and Towns Less Than 5,000*	*Towns and Cities 5,000–100,000*	*Cities 100,000+*	*All Communities*
Crude Rates All Ages	18.9	22.6	12.2	21.1	21.4	21.2	16.5	19.6
Crude Rates Under 20 Years	45.8	52.3	32.9	38.8	41.1	40.1	35.2	38.4
Standardized Rates * All Ages	18.1	18.9	12.9	15.0	13.9	13.2	11.4	13.1
Standardized Rates * Under 20 Years	43.8	48.0	32.8	36.7	34.9	32.5	29.2	32.8
Rates Under 20 Years from History Record Cumulation	40.5	40.0	33.7	37.5	35.7	35.0	31.5	34.5

* Standardization by age to white population of the United States, 1930 Census. Standardizing the general survey rates alters them more markedly than it changes the local survey rates, because the general survey populations were composed of families with 2 or more persons, and therefore contained relatively more children than the general population of the local surveys.

tion" in Table III, no decline in the curve is assumed to occur.

The second method of measuring incidence by the morbidity survey method is that of recording the attacks which actually occurred during the course of the survey. The current incidence in the 3 local surveys and in the Costs of Medical Care study by size of community, as well as the rates under 20 years of age, are shown in Table III. The crude rates are not entirely comparable owing to the varying proportions of individuals in the younger age groups, but it will be noted that the incidence in all but the very largest communities is surprisingly close to 20 per 1,000 for all ages and very close to 40 per 1,000 for ages under 20 years.

Based as they are upon person-years of observation, the figures in Table III are average annual rates and so may be considered as showing the expectancy for whooping cough in the respective communities. However, the local survey periods were relatively short, 36 months for Cattaraugus, 28 months for Hagerstown, and 18 months for Syracuse. It would appear that such periods are not very suitable for the calculation of expectancy because in Hagerstown 2 epidemic periods and only 1 inter-epidemic interval were included in the survey period, so that the rates are rather high. In Syracuse, the rates are possibly somewhat low. In the Costs of Medical Care survey, the period of observation in any given locality was only 1 year, but the distribution of the individual community surveys over a period of years and over a wide geographic range yields a much more nearly true mean rate. However, some care may be necessary in interpreting the crude rates of the general survey because only families of 2 or more were included and because some of the cases not having medical attention have apparently not been recorded. These two factors, one tending to raise the rates and the other to depress them, seem to some extent to have offset one another, for the crude rates of the general survey do not differ widely from those in the local studies.

It is evident that the inverse relationship between size of community and incidence, surmised in the discussion of cumulated history curves, does not appear in the crude rates except in the case of the largest com-

munities. It does, however, appear when the rates are standardized for age. The gradient is most characteristic in the standardized rates of the general survey, the incidence in the local surveys being somewhat irregular for reasons explained above.

The rates under 20 years of age obtained by the method outlined under the discussion on history of prior attack are also given in Table II. Although these are not directly comparable to the other types of rate, they do demonstrate the declining incidence with increasing size of community just as do the standardized rates.

The standardized rate of 13.1 per 1,000 for the Costs of Medical Care survey is the most suitable figure for calculating an expectancy for large areas of the United States. When this is applied to the average white population of the registration area in 1929 and 1930, a total of 1,357,000 cases is obtained. This is a somewhat more accurate figure than the expectancy calculated from the case fatality and deaths, but it should be remembered that it is still a minimal one.

AGE INCIDENCE

The whooping cough rates that were observed in each survey are presented in somewhat more detail as regards age in Table IV.

That whooping cough in common with many other infectious diseases of childhood has an older age incidence in rural than in urban areas has long been known. Because the incidence of whooping cough may have varied somewhat in the various communities, as explained above, the ratio of the rates at specified ages to the gross rates under 20 years of age for the respective surveys is used as the basis of the comparison portrayed graphically in Figure IV for the local surveys, and

TABLE IV

WHOOPING COUGH RATES AND CASES OBSERVED AT SPECIFIED AGES IN THE RESPECTIVE SURVEYS

	1. Local Surveys			*2. General Survey, Costs of Medical Care*				
Age Group	*Cattaraugus, N. Y.*	*Hagerstown, Md.*	*Syracuse, N. Y.*	*Rural **	*Towns and Villages Less Than 5,000*	*Cities 5,000–100,000*	*Cities 100,000+*	*Total*
			Rate Per 1,000 Person-Years Observed					
All Ages	18.9	22.6	12.2	21.1	21.4	21.2	16.5	19.6
0–19	45.8	52.3	32.9	38.8	41.1	40.1	35.2	38.4
0– 4	70.9	117.6	67.9	76.1	83.8	78.3	77.0	78.6
5– 9	65.1	67.5	60.0	50.5	47.0	45.4	36.4	43.6
10–14	29.4	7.0	2.9	16.6	9.8	4.8	4.7	8.4
15–19	9.3	1.4	0	3.9	0	2.4	0	1.5
20+	2.2	0.9	0.6	1.6	0.9	1.3	0.4	0.9
			Number of Cases Observed †					
All Ages	280	373	91	165	192	232	250	840
0–19	260	365	88	159	188	225	247	821
0– 4	102	209	41	78	109	138	162	487
5– 9	104	142	45	59	68	79	79	285
10–14	43	12	2	19	11	6	8	44
15–19	11	2	0	3	0	2	0	5
20+	20	8	3	6	4	7	3	20

* Rural: Does not include incorporated villages, however small.

† The case totals of the general survey include a small proportion of cases in persons who were observed less than the full 12 months, but more than 7 months. As the "part-time" population was also used in obtaining the rates, the latter are not materially affected, but these case totals will not agree with those of studies based upon the "full-time" population only.

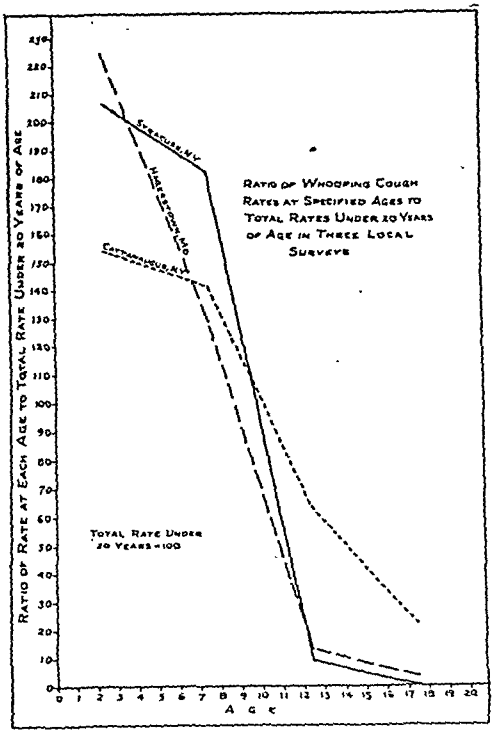

FIGURE IV

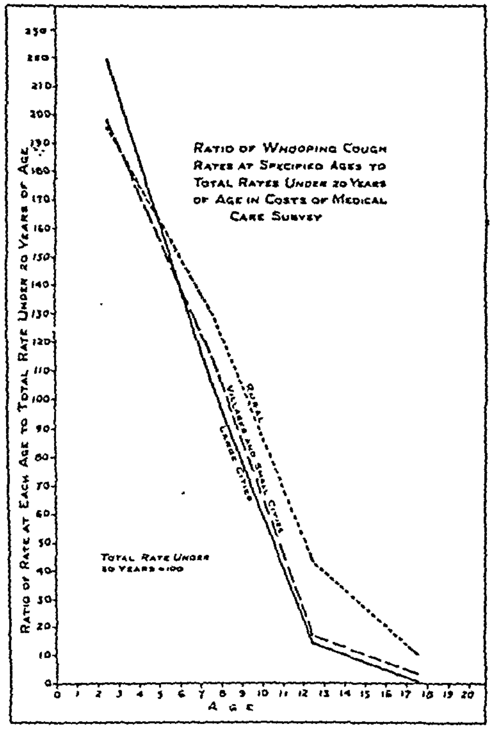

FIGURE V

in Figure V for the Costs of Medical Care study. Possibly the emphasis placed upon families in the general survey has tended to obscure the differences related to size of community, but it will be seen on the whole that the smaller communities tend to have lower rates at the younger ages and higher ones at later ages than do the larger communities.

These differences begin to appear even in small villages as contrasted with farm populations. This is shown in Figure VI, where the respective age-specific ratios of the Cattaraugus survey are compared.

SEX INCIDENCE

The official mortality registration data of many countries show a somewhat higher whooping cough mortality for females than for males at most of the ages of life. This excess mortality in females has long been recognized as a peculiarity of the disease and was at first considered to be due to anatomical differences between the sexes. Of late, however, the tendency has been to find an explanation, at least in part, on the

TABLE V

RATIO OF FEMALE TO MALE INCIDENCE AT SPECIFIED AGES

MALE INCIDENCE EQUALS 100

Local Surveys

Age	*Cattaraugus*	*Hagerstown*	*Syracuse*†
0– 4	122	92	90
5– 9	102	89	185
10–14	110	70	...
15–24	163	182	...
25+	163	118	...
All Ages	114	78	145

General Survey, Costs of Medical Care

	Communities of Less than 5,000	*Communities of More than 5,000*
0– 4	126	103
5– 9	82	97
10–14	137	248
15–24	94	85
25+	1,065*	160
All Ages	106	90

* Male rate computed from a single case

† Rates based upon a very limited number of cases

basis of a higher incidence of the disease among females.* To such an explanation the figures based upon reported cases give a certain amount of support, but data from the various surveys are not entirely confirmatory.

Table V shows the ratio of female to male rates at specified ages for the 3 local surveys and for the major divisions of the Costs of Medical Care study. The only differences which appear constantly here are: (1) a female preponderance in the youngest age-group in small centers of population as contrasted with a very nearly equal incidence or a male preponderance in cities; (2) a tendency to female preponderance after age 15 or 20, a phenomenon which appears in many of the infectious diseases and is probably due to forces other than increased susceptibility.

SUMMARY

The report deals with the case fatality and incidence of whooping cough in various types of population and with technics of obtaining more reliable incidence figures by morbidity survey methods.

The case fatality of whooping cough was found to be extremely low in the surveyed populations, approximately 0.36 per cent.

Of the 3 sources of information on whooping cough prevalence—reporting, recording histories of prior attack, and recording observed attacks—the paper deals only with the last 2, because of the unreliability of reported totals.

The use of history data in the study of incidence is outlined, comparisons made with such data obtained in various localities, and the tentative conclusion reached that whooping cough incidence varied inversely with the size of the community. Further evidence was found for this in the whooping cough rates observed during the period of the respective surveys.

The age-specific rates under age 20 vary with the size of the community, the larger cities showing higher rates among young children and lower rates in older children than the village and farm populations do.

Finally, few outstanding and consistent differences were noted in the incidence of whooping cough among males and among females in the younger ages of life.

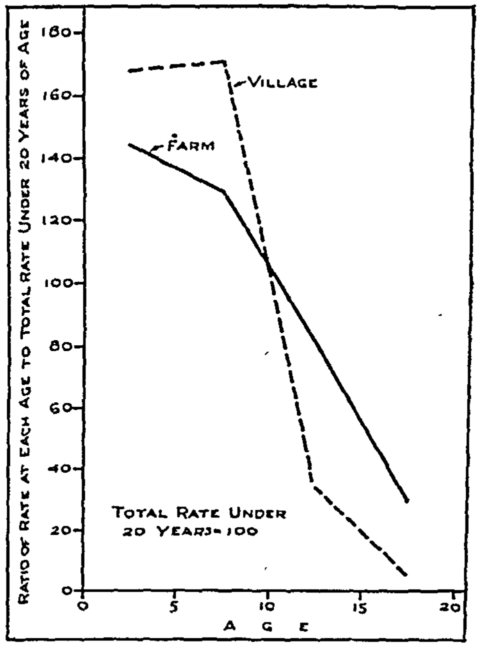

FIGURE VI—Ratio of whooping cough rates at specified ages to total rates under 20 years of age for village and farm populations, Cattaraugus, 1929–1932

* A careful discussion of this question of case incidence and mortality in the sexes will be found in a paper by A. Bradford Hill, entitled "Some Aspects of the Mortality from Whooping Cough," in the *Journal of the Royal Statistical Society*, xcvi, part II, p. 250 ff.

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For an Amended S. 5

SPEAKING for twelve organizations of women, Alice L. Edwards, Executive Secretary of the American Home Economics Association and chairman of a special legislative committee representing the organizations, endorses—with certain stipulations—the embattled S. 5 (the Copeland Bill) designed to regulate sales of food, drugs, and cosmetics.

Besides the Home Economics Association, the groups for which Miss Edwards speaks are: the American Association of University Women, the American Dietetic Association, the American Nurses' Association, the Girls' Friendly Society, the Medical Women's National Association, the National Board of the Y.W.C.A., the National Congress of Parents and Teachers, The National Council of Jewish Women, the National League of Women Voters, the National Women's Trade Union League, and the Women's Homeopathic Medical Fraternity.

We earnestly desire the passage of an amended S. 5.

We consider that it is essential that the seizure provision be changed to conform to the present practice. Of course, this change would include the deletion of the provision that makes it possible for the claimant to require that all trials in connection with seizures of his product be held in the court in the district where he resides.

The so-called variations clause should be so amended as to require that a drug product varying from the standard set forth in official compendiums be labeled to indicate in what way it varies.

We also consider it extremely important that the enforcement of the advertising provisions be left in the hands of the Food and Drug Administration, instead of being transferred to the Federal Trade Commission as is urged by certain drug and cosmetic manufacturers.

We consider it highly desirable that everything possible be done to bring about the enactment of a properly amended S. 5 during the present session of Congress.

We know that Congressmen are receiving many letters from their consumer constituents, urging the enactment of a suitable bill for the consumers' protection. We appreciate the fact that many commercial groups that formerly opposed this legislation now have withdrawn their opposition. We wish that more of them might become energetic supporters, aiding consumers in obtaining the enactment of a bill fair to producers, distributors, and consumers alike. We feel that enactment of such legislation would be of advantage, not alone to consumers, but to all reputable manufacturers and would, of course, set the stage for the renewal of consumer confidence in advertising.—

Printers' Ink, Apr. 9, 1936.

Dermatitis from Synthetic Resins and Waxes*

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DERMATITIS in the manufacture of natural resins and from their use has been reported by numerous observers,[1] but dermatitis in the manufacture of synthetic resins and from their use has not been frequently reported [2] or studied.

The principal synthetic resins manufactured in the United States are:

1. Phenol-formaldehyde resins, sold under various trade names, such as Bakelite, Durite, Durez, Resinox, Indur, etc.
2. Urea-formaldehyde resins, sold under trade names such as Beetle, Plaskon, Unite
3. Coumaron resin, made from coal tar residue
4. Ester gums, which are natural resins, such as Rosin, Dammar and Copal, in which the acid of the resin has been combined and neutralized with glycerol
5. The glyptal resins, which are a combination of glycerol and an organic acid, such as phthalic and malleic acids
6. The vinyl resins, which are vinyl esters, ethers or halides combined with phenol, formaldehyde and hexamethylenetetramine
7. Furfural resins, obtained from combining furfural with phenol (furfural obtained from corn cobs by treating with H_2SO_4 and fractional distillation)
8. Chlorinated resins, obtained by chlorinating various oils and balsams
9. Chlorinated waxes, obtained by chlorinating mineral oils, paraffin, naphthalene, di-phenyl, etc.

These resins are used for many purposes:

For making plastics, such as telephone receivers, pipe stems, push buttons, ear phones, cigar holders, bottle caps, buttons, inks, artificial teeth plates, ornaments, bracelets, earrings.

For making varnishes, flexible coatings, floor finishes.

For making cements, wall boards, gears, dishes, water containers, insulators, rubber compounds, and numerous other objects and for electrical insulations on condensers and wires.

The most important of the resins, from a standpoint of volume used and skin hazards, are the phenol-formaldehyde, the urea-formaldehyde and the coumaron resins.

PHENOL-FORMALDEHYDE RESINS

These are made in two principal varieties:

1. The cast resin, which is finished in the factory
2. The molding resin, which is sold to molding companies and completed in the molding process

Phenol or cresol, formaldehyde and ammonia are mixed in proper proportions in a kettle and heated a sufficient length of time and to the proper temperature.[3] They combine and are drawn out of the kettle in the form of a syrup. This is run into pans and allowed to cool, when it solidifies. This is known as "first stage resin," or "alpha resin." The pans are then heated, the resin re-melted and poured into suitable molds. These are placed in large, mineral oil filled carriers and

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* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

placed into *curing* ovens, where they are heated and go through the so-called beta and gamma stages into the completed cast resin.

After being taken out of the oven, the resin is taken out of the molds and oil, and washed with soap and water and dried, and it is then ready to be carved or lathed or bored into whatever object is desired.

During the course of these operations, formaldehyde is given off and the air of the room is strong with the odor of it, unless adequate forced ventilation is employed. Workers in the rooms who are sensitive to formaldehyde may develop dermatitis of the face, neck, and arms, as well as of the covered parts where there is friction, such as the belt line, the ankle at the shoe top, and the wrist at the cuff line.

The oil used in the curing process dissolves out of the resin some of the phenol and formaldehyde and, if used over and over again, it can contain considerable quantities of these substances. One sample which was analyzed after it came out of the ovens contained 2 per cent each of phenol and formaldehyde. The men handling this oil have their clothes splashed with it and at times suffer not only from oil acne and dermatitis of the legs, thighs, and other parts touched by the oil-soaked clothing, but also from dermatitis due to the irritating action of the phenol and the formaldehyde contained in the oil. The eruption in these cases is usually a diffuse erythematous base on which there are scattered the papules and pustules of an oil folliculitis.

The girls washing the oil off the resin, with soap and water, may also develop dermatitis of the hands and arms from the oil and also from the strong soap solution with which their hands are constantly wet. In many factories, the oil is treated with sodium hydrate after each baking in order to neutralize the phenol and formaldehyde it may contain, but if this is not carefully done, dermatitis may result from too much alkali.

The skin hazards to the users of these cast resins are practically nil, because when they are finished no phenol or formaldehyde are given off from them.

The molding resin is made up in numerous qualities, containing different proportions of phenol and formaldehyde and ammonia. It is carried to the alpha stage or beta stage, and then is ground, heated, and mixed with ground wood, zinc stearate, soap, dyes, and hexamethylenetetramine in a mix mill. From this mill it is discharged on to conveyors, where it is air cooled. While cooling, it forms lumps which are ground in mills to proper sizes fit for molding. The workers engaged in mixing, grinding, and packing the molding resin are all exposed to the dust of the irritating chemicals it contains, as well as to the formaldehyde which it gives off, the odor of which permeates the rooms. Dermatitis is a frequent occurrence in this occupation, especially if the rooms are not properly ventilated to draw off dust, and if the machines and jobs where there is dust are not properly protected by suction hoods.

In a factory employing about 400 workers, where no great care was taken to allay and prevent dust, 27 cases of dermatitis occurred in 8 months. Patch tests performed on 10 cases with various resins, hexa, 4 per cent solution of formaldehyde, and 2 per cent solution of phenol, showed that hypersensitivity to hexamethylenetetramine and to formaldehyde was the cause of 80 per cent of the occupational dermatitis in this plant. Hypersensitivity to phenol was also found, but in lesser degree than to formaldehyde and hexa.

The actual cause of dermatitis from exposure to hexa and formaldehyde is the same. They both finally decompose in the presence of warmth and moisture

into formic acid, which is the real skin irritant.

Dermatitis from the dust of the molding resins usually occurs at the points of friction with the clothing—the wrist, the belt line, the shoe tops and the collar line. It may, however, occur on the covered parts when the dust penetrates the clothing. The skin around the eyelids may also be affected. The eruption consists, usually, of scattered papules and vesicles on an erythematous base.

It gets well if the worker stays away from work, and returns again if he resumes work. In this factory, the dermatitis was more prevalent in the winter because the workers did not take showers in cold weather after their shift, whereas in the summer they were more likely to do so.

UREA-FORMALDEHYDE RESINS

These are made by mixing urea and formaldehyde in a kettle. No heat is required, the reaction generating its own heat. A syrupy liquid results. This is mixed with bleached sulphite pulp, under heat and pressure, and dried in tray dryers. It is then mixed in a ball mill with pigments, zinc stearate, and a small amount of hexamethylenetetramine, about ½ per cent. It is then screened, and is ready for shipment. Minute amounts (fractions of 1 per cent) of other ingredients are added to different brands.

The manufacture of the urea-formaldehyde resins on a commercial scale is more recent than that of the phenol-formaldehyde resins, hence the two factories studied had more modern machinery and safety appliances than the phenol-formaldehyde resin factories. There were adequate ventilation facilities and good facilities for dust prevention. As a result, among 190 employees over a period of over 2 years, there had occurred only 4 cases of dermatitis. They were all due to hypersensitivity to formaldehyde. Two chemists in the experimental laboratory of these plants were hypersensitive to formaldehyde and suffered with dermatitis when exposed to it. One of them exposed his forearm in my presence to the mouth of an open bottle of formalin and almost immediately an erythema developed on the exposed skin.

In a molding plant in Ohio employing about 300 workers, where phenol-formaldehyde and urea-formaldehyde resins are used, 26 cases of dermatitis occurred in the first 10 months of 1934, and in a molding plant in Pennsylvania half of the workers developed dermatitis in the hot months of 1935.

The process of molding is practically the same for all the resins. The powder is placed in a "pill machine" and pressed into proper shapes for the molds. The pills are then placed into the molds where they are subjected to heat and pressure which shapes and hardens them. During the molding process gases are given off from the molds and the odor of formaldehyde is strong in the room and irritates the nose and throat and eyes of those unaccustomed to it.

There is an excess of powder in the molds which flows out during the molding process and is only partially "cured." This is called the "*flash.*" When the molds are opened the flash is cleaned off the molds and filed off the molded object.

Patch tests with the resins with which they worked were performed in the winter on 2 active cases of dermatitis, and 10 workers who had recovered from dermatitis, gave only 2 positive reactions, 1 to the phenol-formaldehyde and 1 to the urea-formaldehyde resin. The examination and history of the 10 cases who had dermatitis but were free of it when the patch tests were made, showed that 2 had dermatophytosis and 1 probably had ptyriasis rosea. It

is probable that a considerable number of the 26 cases reported in 1934 were not of industrial origin.

The same plant was visited in August, 1935. Twelve cases of dermatitis had occurred since the first visit 9 months before. This time 9 workers who had dermatitis during this period were patched with suspected samples of urea-formaldehyde and phenol-formaldehyde resins, as well as with hexamethylenetetramine. Four showed no reactions after 24 hours to any of the 7 patches applied. Five showed positive reactions to one or more of the resins, and of these 5, 3 showed positive reactions to hexamethylenetetramine.

Two of the 4 cases who showed no reaction had eruptions at the time the patches were applied. One was a case of dermatophytosis and the other an eczema which dated back to childhood. The weather was cold (less than 70°) during the period the patches were on, and this may have a bearing on the reactions, because, of the 26 cases reported in 1934, 18 had occurred during periods of hot weather in May, June, July, and August.

There can be little doubt that a considerable percentage of the dermatitis in this plant was of occupational origin.

That hexamethylenetetramine is a major causative factor, is shown by the fact that most of the cases occurred in workers handling the phenol-formaldehyde resin, which contains more of it than does the urea-formaldehyde resin.

Hexa, which was extensively used in the rubber industry as an accelerator and caused dermatitis, has now been almost entirely displaced by other accelerators. It is necessary in certain phenol-formaldehyde molding resins in order to furnish the necessary amount of formaldehyde and ammonia required to go through the gamma stage—or to completion.

In the urea-formaldehyde resin, hexa acts as a stabilizer to prevent the resin from hardening before it is molded.

The ventilating and dust prevention conditions in the molding plants were poor. There were no suction hoods over the molding machines. The suction hood over the "pill machine" was out of order. There was only window ventilation in the workrooms, and wash-ups or showers after work were not compulsory. With proper dust allaying facilities, such as forced ventilation, suction hoods, wet sweeping of floors after each shift, compulsory showers, protective clothing and ointments, the incidence of dermatitis in this plant could be decreased.

Dermatitis may occur in users of molded phenol-formaldehyde and urea-formaldehyde resin wares if the hexa is not all combined. Theoretically, it is all combined in the completed resin, but practically (as in some imperfectly cured pieces or pieces in which there was too much hexa in the molding compound to be completely taken up), there may be a sufficient amount remaining to cause dermatitis in hypersensitive people. The same thing may be true of the phenol, if not completely combined.

Dermatitis has been reported as due to contact with finished resin products, such as dermatitis of the ear from telephone receivers, and of the hands from varnishes.

In order to show that a dermatitis may have been caused by contact with a resin, it must be established that:

1. The dermatitis followed contact with the resin
2. That portion of the skin which came in contact with the resin was first affected
3. A powdered portion of the suspected resin placed on the clear skin near the eruption in the form of a patch test, gives a positive reaction if left on 24–96 hours

To determine the actual chemical in the resin which caused the dermatitis,

the nature and chemical composition of the resin must be determined, and patch tests performed on the patient with each of the chemicals composing the resin in order to determine to which of them the patient is hypersensitive.

The patches of the chemicals should be in such dilutions as will not cause reaction on the normal skin if allowed to remain on for 24 hours.

A 2 per cent aqueous solution of phenol can remain on the normal skin in the form of a patch test, for 24 hours without causing a reaction.

A 4 per cent solution of formaldehyde can remain on the normal skin, in the form of a patch test, for 24 hours without causing a reaction.

Powdered hexamethylenetetramine may remain on the normal skin, in the form of a patch test, for 24 hours without causing a reaction.

Powdered coumaron resin may remain on the normal skin, in the form of a patch test, for 24 hours without causing a reaction.

Coumaron resin is used in varnishes, adhesives, rubber, paint, chewing gum, lacquers, paper and fabric sizing, printing inks, and waterproofing.

It is made from the crude coal tar distillate, which comes off between 150° and 200° C.

This distillate is re-distilled to remove impurities such as benzol, toluol, zylol, naphthalene and tar acids—and a sharply fractionated naphtha is obtained. The naphtha is dried in lead-lined or stone-ware receptacles by treatment with H_2SO_4, in the proportion of 3 to 5 parts per 1,000. After standing a while, the acid is drawn off and fresh H_2SO_4 is added slowly and agitated until 3 to 5 per cent of acid is added. The kettle is kept cold during the reaction with brine-cooled refrigeration.

After the reaction takes place, the mixture is allowed to stand until the tar and sludge settle. They are then removed and the remaining oil is pumped to a neutralizing tank and treated with caustic soda to destroy the remaining acid. The oil is then washed with water to remove the soluble matter, and it is allowed again to settle and the water is removed.

The oil is now distilled and the solvent naphtha is distilled off and the naphthalene is removed by live steam. After this, there remains a heavy oil boiling at 320°–330° C., which is removed from the resin.

COUMARON RESINS

There are no skin hazards, outside of acid and alkali burns, in these operations, because they are totally enclosed. No skin lesions were found in a large plant and the medical records for a number of years showed no cases of dermatitis.

Dermatitis has occurred from coumaron resin in varnish which was used on heddle frames in a cotton mill. The skin on the forearms of the weavers was struck continuously by the moving heddle frames and some developed dermatitis. Patch tests showed that they were sensitive to chlorinated ceresin and coumaron resin in the varnish. The varnish grades of coumaron resin, especially the darker resins, may contain sulphuric acids resulting from the sulphuric acid treatments, if they are not carefully prepared, and it is these acids that cause dermatitis.

SYNTHETIC WAXES

The principal synthetic waxes manufactured in this country are chloro naphthalenes and the chloro diphenyls. They are both used for practically the same purposes—as electric insulators on condensers, as insulators on electric wires, in paints, varnishes, and lacquers, and as oil in transformers.

The chlorinated naphthalenes are made by passing chlorine through

naphthalene and replacing of the hydrogen atoms with chlorine. One or more of the hydrogen atoms can be replaced, forming mono, di, tri, up to per chloro naphthalene, in which 8 of the hydrogen atoms are replaced with chlorine, the formula being $C_{10}Cl_8$. The more chlorine, the more solid is the material.

In making chlorinated diphenyls, it is first necessary to manufacture diphenyl, $C_{12}H_{10}$. This is manufactured by passing benzol, C_6H_6, through molten lead, at a temperature of about 800° F., where 2 molecules of benzol combine to form 1 molecule of diphenyl, hydrogen being set free.

Diphenyl is a solid, crystalline-like substance. This is melted in closed cylinders and chlorine is bubbled through, replacing the hydrogen. One or more of the hydrogen atoms can be replaced, forming mono chloro diphenyl, di chloro diphenyl, up to deca chloro diphenyl, $C_{12}Cl_{10}$. Hydrochloric acid is a by-product of this reaction. The chloro diphenyls are liquid or semi-solid, up to the hexa chloro diphenyl.

Nonochloro diphenyl, $C_{12}HCl_9$, sold under the trade name of Arachlor, is used as an insulator for automobile electric wires and in condensers, and also as a de-lusterer of rayon.

In the manufacture of the chloro diphenyls, the workers are exposed to a benzol hazard when the diphenyl is made, as well as to a hazard from the inhalation of the fumes of diphenyl.

The workers engaged in chlorinating the diphenyl, especially that part of the operation where the crude Arachlor is being re-distilled to remove impurities, are affected with an acne-like condition of the skin. This also occurs in workers exposed to the fumes of the chloro naphthalenes, or Halowax. The fumes of these compounds cause acne on the face and neck and may penetrate the clothes and cause acne-like lesions to develop on the covered parts, the shoulders, and the belt-line, and even on the penis. The lesions on the skin resemble acne. They begin as small, pale, elevated papules, many *having no openings in them.* They develop into hard cyst-like elevations under the skin, some of which go on to suppuration, forming boils. Some of the lesions also occur at the mouth of the follicles and resemble the comedones and pustules of acne vulgaris.

In addition to these skin lesions, symptoms of systemic poisoning have occurred among workers inhaling these fumes. Those working with the chloro diphenyls have complained of digestive disturbances, burning of the eyes, impotence and hematuria. The latter symptom developed among a number of men making amino diphenyl, which is used in the manufacture of a rubber antioxidant. Cases of death from yellow atrophy of the liver have been reported among workers exposed to the fumes of the chloro naphthalenes.

Patch tests performed with Halowax and with the chloro diphenyls have yielded negative results. The skin lesions probably result from the mechanical plugging up of the follicles of the skin with the waxes as the fumes solidify on the skin.* The chlorine present in the waxes may have an irritating effect on the plugged follicles and cause suppuration.

PREVENTION

1. The protection of the workers from the irritating chemicals that compose the resins and waxes from the resins and waxes themselves. To do this, the process should be totally enclosed. If this is not possible, hoods with suction exhaust should be so placed over open processes that dust and fumes are pulled away from the worker and out of the room.

* I have recently seen the wife and child of a worker who had developed comedones and pustules from contact with his work clothes which were saturated with halowax and which he was accustomed to wear at home. L. S.

2. The workrooms themselves should be ventilated by intake and exhaust fans to remove dust and fumes.

3. The floors, walls, and ceilings should be washed down at frequent intervals to keep them free of dust.

4. Two lockers should be furnished to each worker. One for his street clothes and one for his work clothes. The lockers for street clothes and work clothes should be in separate rooms, with the shower baths between the locker rooms. The worker coming to work enters the locker room for the street clothes, takes them off, and puts them in the locker and goes into the locker room where his clothes are kept and dons them. From this room he goes to the workrooms through a connecting door. At the end of his shift, he goes through this door to the work clothes locker room, takes off his work clothes and leaves them on the floor or bench to be washed and then goes to the shower baths and bathes and dries. Then he goes to the street clothes locker room, puts on his clothes and goes out of the door leading to the street. It has been estimated at one plant where such a system was instituted that 6 cents a day per worker will take care of furnishing clean work clothes each day.

5. New workers who are hypersensitive, but have only mild eruptions, should be given protective ointments and clothing and kept at work for about 3 or 4 weeks with the hope that they will develop an immunity or become "hardened." If this does not occur, they should be taken off the job.

6. New applicants for jobs should be carefully examined for skin diseases and those found to have them should not be employed.

7. There should be periodic medical examination of workers to detect cases of dermatitis and workers in chlorinated naphthalenes and diphenyls should be periodically examined for symptoms of systemic poisoning.

8. Laws should be passed making it compulsory for factories where there are skin hazards to adopt these measures.

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A. I. C. P. Guide for Public Health Nurses

A *GUIDE for Public Health Nurses* published by the New York City Association for Improving the Condition of the Poor, is a unique publication. A systematic description of cardiac conditions, for the benefit of public health nurses and a guide to the care which they can give patients has recently been prepared by the Bureau of Educational Nursing and has been subjected to the criticism of outstanding cardiologists.

Similar guides covering syphilis, child development, and tuberculosis have recently been revised and, although intended for the nursing staff of the A.I.C.P., they will readily be of interest to a wider circle.

Set-Up and Budget for Public Health Education*

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MODERN public health practice has shown how to prevent much unnecessary sickness and premature death and how to maintain and promote personal and public health. How can the necessary factual information be brought to public attention in such a manner as to produce action? Able direction of a well organized and financially supported health education program for the state and local areas is essential. The major purposes are: to make health information public by technics which arouse, stimulate, and guide motives for healthful living; to provide the members of a community with an understanding of the functions and services of a health organization, of the community responsibilities for public health work, and of the opportunities of individuals and groups to insure adequate support of essential public health services.

There is no single formula for a "set-up and budget" for public health education. Conditions vary enormously in different communities or localities. Certain basic principles have been developed which are subject to review periodically as new discoveries are made or new technics are found practical. The importance of periodic evaluation of health education programs is becoming increasingly recognized, but methods of evaluation have been only partially developed.

RESPONSIBILITY AND TEAM WORK

A comprehensive health education program embraces at least 3 closely related phases: (1) popular health instruction, (2) health education for professional groups, and (3) school health education. To fulfil the obligations of this threefold program, and to provide opportunity for coöperative study and future planning, the various features may well be correlated and developed through a public health education council. Such a council may be formally organized as an independent group or as a part of a community health council, or it may merely take the form of informal conferences of representatives of the community agencies interested in health education.

The ultimate responsibility for community health education rests with the health officer or someone selected by him who has experience and training for the task. Even though health education work in schools is the major responsibility of the education authorities, the health officer should supply current information regarding health conditions, and aid in the provision of available services for health education of teachers and pupils. The state department of health likewise has a responsibility to serve as an advisory and

* Read before the Public Health Education Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 9, 1935.

correlating force, and to provide some basic tools for health education work. In addition, the state department can pass on to the local communities the valuable materials and methods developed by national health agencies.

CLARITY IN PLANNING

Bertrand Brown has defined 4 basic tasks in health education which are applicable to the 3 phases of a health education program. These are indicated by the 4-part question: (a) What ideas, images, and emotional appeals must be conceived, accumulated, arranged, set forth, and produced; (b) transmitted through what medium, or by what means; (c) to what audiences, in what locality or localities; (d) to accomplish what objectives?

In order to plan health education work intelligently, and to pursue it economically and effectively, each of these 4 fundamental tasks, closely related, needs consideration.

OBJECTIVES BASED ON STUDY

Advance preparation of a carefully considered program is essential to good work. The basis for program making is a study of the situation to determine the major factors involved, the public response desired, and the necessary procedures. The objectives should then be definite and reasonable. For example, the health officer should have clearly in mind what he wishes the people to do as the result of health advice. The final test of health education is not how much information is distributed, but how behavior is influenced. The objectives should have importance locally and be attainable with the facilities at hand. The technic of gaining public attention and of producing action is an art and a science, requiring a knowledge of human motivation, of human interests, and of human actions.

COMMUNITY PARTICIPATION

Having studied the community, the next steps are the enlistment of community forces, the selection of subject matter, and the development or utilization of technics of application of various methods. Methods should be selected for reasons of economy—with a view to reaching the largest numbers effectively at the smallest expense; for attention value, to reach persons under conditions which are favorable to secure attention; and for their suitability to the subject matter. For example, some topics lend themselves to exhibits, others to the newspaper, others to classroom projects.

The selection of material to be presented to the public, including professional and school groups, will depend upon local circumstances. In addition to general health information which is aimed to build up a better public understanding, advice may be given regarding specific problems such as special disease hazards or the pressure of nursing services. An understanding of problems and opportunities is necessary to bring about intelligent action regarding the maintenance of qualified personnel and an adequate budget.

There are several important groups to be kept informed for whom the objectives and methods vary. These groups include: (a) responsible citizens, (b) public officials, (c) medical and related groups (doctors, dentists, nurses, hospital staffs, veterinarians), (d) recreation and social workers, (e) school teachers, (f) clergy, (g) children (schools, 4H clubs, etc.), and (h) the general public.

In considering the set-up necessary for health education work, attention must be given to the methods which are suitable for each group to be reached. Too little has been done with the prominent citizens, business and club leaders, and public officials, whose un-

derstanding of the opportunities and services is necessary to insure support of public health activities. Through these groups may be developed informed public opinion, aid in specific matters of program and budget, and channels of sound information regarding public health within a community. Methods which may be used include personal contacts of health personnel, health talks, committee participation, exhibits, motion pictures, distribution of annual reports, periodic bulletins, pamphlets or special books on health subjects, and press releases.

With medical and related groups, a primary objective is to secure improved and wider utilization of preventive medical services. The advice and assistance of these bodies are fundamental for success.* As with the school teachers, the clergy, welfare workers, and other professional groups, the individuals must be kept informed to enable them to discuss and interpret effectively the work of health organizations. For the broad community phase of the program, there must be staff talent to prepare or to secure attractive and authentic printed material of various kinds, and to stimulate volunteer leadership and participation.

As defined by the fourth health education institute, the school health program aims to establish habits, practices, and attitudes toward health which will carry over into adult life and enable the individual to function as a healthy person. A division of school health education, built around a supervisor for a county or city, and a director for a state, the work being correlated with the health department and other health agencies, is an essential factor in the development of a well rounded community program. To enlist community participation, then, a well conceived educational program must be based on material of accurate fact, properly interpreted. A calendar of projects for the year, somewhat flexible, is a useful guide.

PERSONNEL AND BUDGET

For many years there has been much study and experimentation in public health education. The organization of an effective program in a community depends in no small degree upon the resources of the health department and the initiative and ability of the health officer. In the smaller communities, popular health instruction work may be entirely directed by the health officer, who may utilize civic and professional groups for assistance and advice. The school health education services may be supervised and coördinated by a well trained worker with educational background and organization ability serving on a county-wide basis, and working closely with both the education and health organizations of the county and state.

In cities of 100,000 population or over, the health officer will need the assistance of a popular health instruction director or supervisor, with a staff suitable for the size of the community. This person should understand the facts to be given to the public, have organization ability and newspaper sense, be familiar with the useful free material available, and be able to utilize statistics and other source data in a practical manner. Most of the budget for this work will be for salaries, including stenographic service, with a reasonable allotment for materials. Except in the largest cities, most of the printed material and exhibits will be obtained from sources other than the local health department.

From 2 to 3 per cent of the total public health budget (4 to 6 cents per capita per year) would seem to be a

* Medical associations are helping in constructive programs of health education in many localities. The American Medical Association, through a special division, and national health agencies are rendering valuable service.

reasonable amount to set aside for the purpose of popular health instruction in addition to the provision of a division of school health education. The latter may be so organized that the supervisor is the liaison officer on health affairs between the school and other community health agencies, as well as the nucleus around which health work in the schools may be developed. Here again, most of the specialized budget will be for the salary item. As the principals and teachers become more and more familiar with public and personal health principles, they can assume increasing responsibility for many details of health education to be furthered in the regular curriculum.

State departments of health have been gradually adding public health education divisions or services to the administrative organizations with beneficial results. In 1930, the proportion of the health department appropriation in 11 states varied from 0.5 per cent to 7 per cent, with a median of 2.2 per cent. Twenty-five states in that year conducted this work in the executive or central administrative office. There is a growing tendency on the part of state departments of health to form some type of liaison arrangement with the educational authorities whereby improved courses in hygiene are incorporated into the educational system. There is also a growing tendency to use the educational system for the promotion of general health education work. Increasing attention to the health aspects of the school program given by teachers colleges and boards of education should provide increased personnel resources, and may gradually modify existing programs of both the school and community health departments as they relate to health education.

Public health education is a relatively young and rapidly developing field of public health activity. There is yet much pioneering and discriminating study to be done. Emphasis is properly being given to the psychological aspects of the problem and to many other related subjects. Patience, perseverance, and confidence in the ultimate possibilities are required of the workers to provide a stable program, properly integrated with the other essential features of community health work.

Bullock County, Ala.

IN connection with the Rural Health Conservation Contest a rather unusual activity for Chamber of Commerce Health Committees was recently undertaken by the Health Contest Committee of Bullock County, Ala., of which committee Judge W. E. McNair is Chairman. The committee undertook the publication of a 12 page bulletin on Good Health, containing vital statistics data, information on the use of Burr cottages for the care of tuberculosis cases, with general control measures, sanitary type of privies, rodent control, mosquito control, rabies control, and with special data on the health activities of the county schools and the county health department.

Veterinary Service in the Control of Dairy Products*

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IN terms of human welfare, milk and milk derivatives affect more generally and more closely the daily lives of men, women, and children in this country than any other food product. As a corollary, the relation of veterinary science to public health is best exemplified in the veterinary aspects of milk control. The story of safe milk as a factor in promoting human health has been signalized, dramatized, and advertised, but the consuming population is only partly conscious of the affiliation between the medical sciences, their correlated activities, and the wholesomeness of the dairy products made available.

The tremendous progress made in the development of safe milk supplies and the part played by safe milk in improving our health status make an absorbing story. It is a story of research and observation, of putting to work facts revealed by patient research, and finally of practical application of accumulated knowledge and experience to the everyday problems of milk production and distribution. It is a story to which many branches of science, the professional health worker, and the dairy industry itself, have contributed about equally.

The scope of this paper is a discussion of veterinary science and veterinary service in the control of dairy products. Recognition of the fact that certain infectious diseases of cattle are transmissible to man through milk, also that some less specific conditions, particularly of the lactating udders of cattle, may render milk unwholesome for human use, has served to focus attention upon a fundamental of pure milk, namely, the health of dairy cattle. These facts, along with the problem of human disease transmissible through milk, have necessitated the development and interposition (between the producing animal and the consumer) of protective measures, especially pasteurization, in order that the general market milk supply may be adequately safeguarded.

VETERINARIANS AND THEIR GENERAL ACTIVITIES

In reviewing the veterinary aspects of milk control, the outstanding contribution which the profession has made to the creation and development of safe milk supplies is seen in the control of bovine diseases by private and organized veterinary agencies. In order to visualize how these activities have been and are carried on, a bird's-eye view of the veterinary profession as it exists in this country will be helpful.

A survey[1] made a few years ago by

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* Read before the Laboratory Section at the Sixty-fourth Annual Meeting of the American Public Health Association in Milwaukee, Wis., October 10, 1935.

the Committee on Education of the American Veterinary Medical Association showed that there are between 12,000 and 13,000 graduate, registered veterinarians in the United States, of whom about 9,400, or roughly 75 per cent, are engaged in private practice (Table I). In animal disease control, the practising veterinarian serves as the first line of defense as does the practising physician in human disease control. Of the remaining 3,000 to 4,000 veterinarians, about 1,400, or a little less than 12 per cent, are engaged in U. S. Bureau of Animal Industry and other federal work, and about 700, or a little more than 5 per cent, in state bureaus of animal industry. About 1,000 veterinarians are engaged in teaching, commercial, municipal, and army activities.

TABLE I

LINES OF WORK ENGAGED IN BY VETERINARIANS [1]

	Number	Per Cent
Practice	9,359	76.5
Army	126	1.0
Bureau of Animal Industry (Federal)	1,353	11.1
Other Federal Work	60	0.5
State	660	5.3
Teaching	230	1.9
Commercial	250	2.0
Municipal	202	1.7
Totals	12,240	100.0

The survey, which represented a very complete analysis of the veterinary situation from the educational and professional standpoints, also indicated the average distribution of time given to various species by a representative group of practising veterinarians (Table II).

It is significant in connection with our consideration of dairy products that the modern practising veterinarian gives, on the average, more of his time to cattle than to any other species.

There are a number of activities re-

TABLE II

DISTRIBUTION OF TIME GIVEN TO EACH SPECIES BY PRACTISING VETERINARIANS [1]

	Per Cent
Cattle	38.0
Pets	23.9
Horses	18.5
Swine	14.1
Poultry	3.0
Sheep	2.3

lating to milk control which require either the employment of veterinary personnel or the coöperation of agencies whose professional staff is composed principally of veterinarians. Chief among these are:

1. *Control and eradication of bovine disease under official supervision*—This work is carried on and participated in by (1) the U. S. Bureau of Animal Industry working coöperatively with (2) state bureaus of animal industry, or state livestock sanitary boards; these agencies employ in addition to their full-time veterinary personnel (3) many practising veterinarians on a part-time basis.

2. *Milk and dairy inspection under official supervision*—This work is participated in by: (1) veterinarians employed full-time by state and municipal departments of health or other agencies charged with regulation of milk supplies; and (2) practising veterinarians authorized to make dairy herd examinations.

3. *Milk and dairy inspection work carried on by producer and distributor organizations*—This work is voluntary and relates principally to milk quality improvement and disease control, principally of mastitis, among dairy herds. It is carried on by veterinarians employed full- or part-time by commercial milk organizations to do field inspection and educational work with milk producers. It is an important adjunct in many areas to the official milk inspection program.

There are other ways in which veterinary activities are correlated with dairy products control but these are of major importance.

1. Control of Bovine Diseases and Safe Milk

The safety of milk is determined chiefly by 4 factors: (1) the health of dairy cattle, (2) the health of dairy employees, (3) methods of producing and handling milk to prevent contamination, and (4) the additional protection—effective pasteurization—which is necessary in order that the general market milk supply may be adequately safeguarded. It is conceded that healthy dairy herds are a fundamental without which the development of our milk supplies to meet consumer needs would be extremely unsound and unstable.

We have a vast fund of information on the origin and nature of diseases of the dairy cow; on methods of diagnosis and methods of identifying the causative organisms; on the communicability of certain of the diseases to other animals and to man; on methods of control and eradication. Most of this has come to us in the last 4 decades as the result of research which now forms the basis for nation-wide programs of disease control among dairy cattle. Sufficient of this knowledge has been applied on a scale which not only enables us to foresee the future but also to view in retrospect the accomplishments to date.

BOVINE TUBERCULOSIS

Bovine tuberculosis is the best example of an animal disease communicable to man which may soon cease to exist here as a danger to human or animal health. The story of bovine tuberculosis and its relation to human health—particularly child health—has been told too often to require repetition. We should be equally familiar with the federal-state program for elimination of bovine tuberculosis that has been under way since 1917.

The first tuberculin test of dairy cattle was conducted in this country in 1892. Thereafter it was applied to ever-increasing numbers of cattle by private veterinarians and the state and federal bureaus of animal industry. As a group, certified milk herds were the first to require regular tuberculin tests; this was done shortly after the introduction of tuberculin as a diagnostic agent. In 1917, the movement received its first real impetus when the federal-state coöperative program embodying the uniform accredited-herd plan was adopted and provision made for payment of indemnities for slaughtered tuberculous cattle. This work proved very successful and was made still more effective in 1923 when the area plan of tuberculin testing was put into effect.

In the 19 years from 1917 to 1935, more than 150 million tuberculin tests were made on cattle and about 3¼ million reactors removed from the herds and slaughtered. As a result, on May 1, 1935, 2,237 counties, or 72.8 per cent of the 3,071 in the United States, were classed as modified accredited areas (areas in which there is less than 0.5 per cent bovine tuberculosis). Twenty-five whole states are now designated as modified accredited areas (Arkansas, Colorado, Florida, Idaho, Illinois, Indiana, Kansas, Kentucky, Maine, Michigan, Minnesota, Missouri, Nevada, New Hampshire, New Mexico, North Carolina, North Dakota, Ohio, Oregon, Utah, Virginia, West Virginia, Washington, Wisconsin and Wyoming).

Perhaps many of us are not aware of the marked effect which this work has had upon the human death rate from tuberculosis. State and city health officials have vigorously backed up the tuberculin testing program of

TABLE III

DEATH RATE FROM TUBERCULOSIS IN THE UNITED STATES

Calendar Year	*Respiratory Tuberculosis*	*Other Forms*	*Cattle Tested Fiscal Year June 30*	*Number Reactors*	*Per Cent Reacting*	*Per Cent Retained*
1900	180.5	21.4				
1901	174.5	22.4				
1902	162.6	21.9				
1903	164.9	23.6				
1904	176.2	24.5				
1905	166.7	25.6				
1906	155.6	24.6				
1907	154.3	24.2				
1908	144.0	23.6				0.88
1909	137.7	23.4				1.27
1910	136.0	24.3				1.42
1911	132.7	26.5				1.57
1912	125.0	24.7				1.98
1913	123.0	24.8				2.02
1914	123.5	23.7				1.98
1915	123.5	22.8				2.11
1916	119.9	22.2				2.35
1917	124.6	22.5	20,101	645	3.2	2.11
1918	128.6	21.4	134,143	6,544	4.9	1.80
1919	107.5	18.1	329,878	13,528	4.1	1.57
1920	97.0	17.0	700,670	28,709	4.1	1.62
1921	85.6	13.3	1,366,358	53,768	3.9	1.62
1922	84.3	12.1	2,384,236	82,569	3.5	1.76
1923	81.3	11.5	3,460,849	113,844	3.3	1.75
1924	78.0	11.7	5,312,364	171,559	3.2	1.56
1925	75.9	10.8	7,000,028	214,491	3.1	1.51
1926	76.6	10.7	8,650,780	323,084	3.7	1.41
1927	71.4	9.5	9,700,176	285,361	2.9	1.15
1928	70.3	9.0	11,281,490	262,113	2.3	1.04
1929	67.6	8.4	11,683,720	206,764	1.8	1.00
1930	63.4	8.1	12,845,871	216,932	1.7	0.75
1931	60.7	7.5	13,782,273	203,778	1.5	0.62
1932	56.6	6.4	13,443,557	254,785	1.9	0.49
1933			13,073,894	255,096	2.0	0.42
	Totals		115,170,388	2,693,570	2.3	

(Official Statistics compiled by H. R. Smith, Livestock Commissioner, National Livestock Exchange)

The relationship of the number of cattle tested in the United States, the reactors slaughtered, the decline in percentage retained for tuberculosis (lesions found on post-mortem) of all cattle slaughtered, exclusive of reactors, and the decline in the human death rate from respiratory and other forms of tuberculosis per 100,000 population in the United States. The federal and state coöperative testing program started in 1917. This is from data furnished by the U. S. Bureau of Animal Industry and the Division of Vital Statistics, Bureau of the Census.

the state and federal bureaus of animal industry which has resulted in reducing the number of positive reactors in cattle from 4.9 per cent in 1918, to 1.1 per cent for the year ending June 30, 1934. This support has been forthcoming because of evidence such as that given by Park and Krumwiede [2] and others that the bovine tubercle bacillus causes about one-tenth of the bone, joint, and lymph node tuberculosis in adults, and one-fourth of this type of tuberculosis in children. In young children it is said to cause from 6⅓ to 10 per cent of the total fatalities from tuberculosis.

H. R. Smith, Livestock Commissioner of the National Livestock Exchange, has called attention in a con-

vincing manner to the changes in the death rate from tuberculosis in man since 1918. He has compiled official statistics[3] from the U. S. Bureau of Animal Industry relating to tuberculin tests of cattle, percentages of reactors and percentages of other cattle "retained" after slaughter, along with data from the Division of Vital Statistics, Bureau of the Census (Table III). The human death rate from respiratory tuberculosis in the United States in 1918 was 128.6 per 100,000 population, but it has decreased every year since then, and last year was 56.6, or less than half the rate in 1918. During the same time the death rate from tuberculosis other than respiratory declined from 21.4 per 100,000 in 1918, to 5.9 in 1933. It is not claimed that this was due entirely to the coöperative program of the government for the eradication of bovine tuberculosis death rate, but it is significant that during the 18 years prior to 1918 the death rate from tuberculosis other than respiratory did not decline; in fact, the trend was slightly higher: 21.4 per 100,000 in 1900, and 22.5 in 1917, with no fall below the 1900 rate in the intervening years. Commenting on these figures, Smith says:

> According to medical authorities, cases of human tuberculosis other than respiratory such as glandular, bone, and abdominal are to a large extent of bovine origin. The decline in the death rate from respiratory tuberculosis from 1900 to 1918 is probably due to improved sanitation and medical care. It is apparent that this was offset in its affect on other forms of tuberculosis by the increase in this disease in cattle during that period, as indicated by the increased percentage retained. While there was no decline in the death rate from non-respiratory tuberculosis from 1900 to 1917, when the federal and state coöperative cattle testing was started, the decline in the death rate from such types has since been pronounced.

This analysis does not take into account the concurrent effect that increased pasteurization of milk supplies has had since 1918, which is considerable in those states where the process has been rapidly expanded in recent years. The observations of Park in New York City indicate marked reduction in human infections with bovine tubercle bacilli since pasteurization was applied to all milks except certified.

Nevertheless, a greater decline in the bovine type of infection in humans has been noted after the tuberculin test of *all* dairy cattle was required for *all* grades of milk than when pasteurization alone was depended upon for protection. The moral is obvious.

THE USE OF MILK FROM TUBERCULIN TESTED HERDS

As the tuberculosis eradication program has progressed, the number of cities and states which demand milk from tuberculin tested cows has increased rapidly. Within the past year tuberculin testing has proceeded so rapidly that an accurate estimate of the amount of so-called "tuberculin tested" milk cannot be made. However, in the 5 years, 1927–1931 inclusive, the amount of such milk in cities of 10,000 and over increased from 68.1 to 88.7 per cent, or more than 20 per cent. Effective pasteurization will kill bovine tubercle bacilli, but the requirement that dairy herds shall be free from tuberculosis even if the milk is to be pasteurized recognizes the principle that processing methods cannot replace proper standards of health for dairy animals.

The relation of veterinary science to the safeguarding of milk supplies from the menace of bovine tuberculosis has been reviewed at considerable length because it symbolizes what may be done by joint action in surmounting risks to human health. The responsibility for sanitary control of milk supplies rests, as it should, very largely on medical and other professional health officers; the veterinarian serves as the qualified

instrument to carry out measures for animal disease control.

BRUCELLOSIS IN ANIMALS AND MAN

Bang's (abortion) disease is another common infection of dairy cattle caused by an organism sometimes capable of infecting human beings. Brucellosis of man and animals seems of greater current interest to health authorities than bovine tubercle infection. Since a certain proportion of Brucella infections in man is acquired through raw dairy products, the efforts to control the infection in cattle are relevant to any discussion of the veterinary aspects of public health.

Although Bang's disease has been continuously studied since the discovery of the causative organism in 1896, the most intensive efforts to work out methods of control and elimination have been applied during the past decade. The agglutination test is a reliable means of detecting Brucella infected animals. When repeated at suitable intervals by experienced operators, followed by the removal of reactors, the test is a dependable method under favorable circumstances of ridding herds of the infection. Cotton and his associates [4] of the U. S. Bureau of Animal Industry, have shown that the blood-serum test in competent hands gives more reliable information regarding udder infection with *Brucella abortus* than the milk serum test; also, that a blood-serum titer of 1:1,000 nearly always indicates udder infection; at 1:200, about 50 per cent of the animals so reacting have infected udders; at 1:100, cows rarely show infected udders unless they have recently been infected and have not reached their maximum agglutination titer. Repeated tests will detect such animals.

Several other investigators have reported similar observations so that, from the public health viewpoint, it may be concluded that dairy herds effectively maintained free from reactors to the agglutination test at 1:100 or higher, present little, if any, danger of transmitting brucellosis; exceptions are very rare. Not all cases of brucellosis in man are caused by the bovine type of infection or by infected milk, but the number is sufficient to require that adequate protection be given milk consumers. This protection is furnished by removal of all infected cattle from dairy herds, by pasteurization, or by a combination of these methods.

Much more information, especially much better epidemiological evidence, is needed in order to evaluate with accuracy the importance of Bang's disease to human health. Lacking this information, one cannot visualize the extent to which public health and animal health agencies will combine in supporting an elimination or control program against the bovine disease. In the case of bovine tuberculosis, the eradication program received its greatest stimulus and greatest support, both scientific and legal, on account of human health implications. In Bang's disease, the public health aspects are not yet so clearly defined although the economic aspects are quite fully recognized by the livestock industry.

When the health and economic phases of Bang's disease have been more fully appraised, it should be possible to decide whether or not the nation should embark upon a wholesale eradication program as was done with bovine tuberculosis, or work out other control methods, including immunization of dairy animals. In any event, the final responsibility for carrying out whatever measures are adopted will fall very largely on veterinary agencies.

Of interest in the consideration of undulant fever at this time is the federal Bang's disease testing program that has been carried on for over a year as one of the emergency measures

of the Agricultural Adjustment Administration. Originally designed to reduce dairy cattle populations and thereby milk surpluses, the A.A.A. allotted funds to the U. S. Bureau of Animal Industry for disease control work which was broadened to include Bang's disease. The tests have been conducted more or less actively in all but 2 states since July, 1934. The federal government has paid indemnity to the owners of reacting cattle, amounting to not more than $50 each for pure-bred, and from $20 to $25 for grade cattle.

A summary of this work to June 30, 1935, shows that more than 3,300,000 cattle have been tested, of which 381,000 were found to be reactors (complete agglutination in dilution of 1:100 or above). These figures include a considerable number of retests. On initial tests all over the country, the average reactor rate has been 14 per cent of the cattle under supervision. Infection has been found in about 43 per cent of the herds tested.

Funds have been allotted so that this work can be continued to July 1, 1936. It is hoped that many of the dairy herds, under proper supervision, will be maintained free from abortus infection. Some states already have made provision to add to the federal indemnity or to carry on the program after the federal assistance ceases.

The foregoing considerations of bovine tuberculosis and Bang's disease are illustrative of what may be done by veterinary research and veterinary supervision in protecting milk supplies from animal contagions. There are other less common diseases of dairy animals which are kept in check or not permitted to retain a foothold in this country. Foot-and-mouth disease is one of the most highly contagious diseases for cattle; man is somewhat, although not particularly, susceptible to the infection either by direct contact or through drinking infected milk. Children are more susceptible than adults. On the few occasions that foot-and-mouth disease has gained entrance to this country, it has been eradicated as promptly as possible by complete destruction of infected and exposed herds. Thus, through the operation of veterinary police measures, foot-and-mouth disease does not exist in the United States either as an animal disease or public health problem.

2. Official Milk and Dairy Inspection Service

State and city health departments all over the country quite commonly employ veterinary personnel to carry on certain phases of milk control work. In some instances, these veterinary activities are related solely to disease control supervision to see that the local requirements with respect to tuberculin tests, physical examinations, etc., are observed in the dairy herds comprising the milk-shed. In others, the veterinary personnel is charged with all phases of dairy inspection work, covering the herd, the stable, and other physical equipment, and production and handling methods.

3. Industrial Milk and Dairy Inspection Services

One of the prominent characteristics of modern milk supplies has been the development by producer and distributor organizations of their own inspection and control services. The desire of, or the necessity for, commercial organizations to foster quality improvement work is an outgrowth of healthy competition and the increasingly complex official requirements and regulations with which health departments have surrounded milk supplies, particularly in our metropolitan areas. The sum total of the benefits derived in terms of better educated dairymen, healthier herds, better dairy facilities,

and higher quality milk is tremendous. With the aid of these commercial inspection services, the compliance of dairy farmers with local regulations has been greatly facilitated in many instances. Through the field inspection work carried on by milk distributing organizations, the meaning, importance, and necessity of many milk regulations have been translated to milk producers more effectively perhaps than would have been the case otherwise.

Bonuses offered to producers for higher fat, lower bacteria count milk, and for improved dairy facilities have resulted in constantly improved milk supplies. Veterinary field work by distributor organizations has also been extremely helpful in showing the dairy farmers the advantages of tuberculin testing, of mastitis control, and of dairy hygiene and sanitation in general. The grading system with its higher prices for better quality milk has had a salutary effect on those milk sheds where it has operated. Veterinary personnel has been one of the principal media through whcih the programs have been put into operation.

It has been impossible to determine accurately the extent to which veterinarians and veterinary agencies contribute essential services in the control of dairy products. It is certain, however, that a survey would show a long list of activities and accomplishments in addition to those discussed.

Space does not permit more than brief mention of the work already done and to be done in the control of bovine mastitis. This disease certainly occupies front rank among bovine ailments in its effect upon the quality and economic phases of milk production. Its public health implications are less well defined except on the general principle: milk from cows having mastitis, whatever the cause, is not fit for human consumption. This principle necessitates a workable definition of mastitis of a degree significant to public health and milk quality. I shall not attempt the definition but would call attention to the frequent misunderstandings and mis-statements relative to mastitis and the streptococci which are commonly associated with it. The statement, "Milk containing large numbers of mastitis streptococci causes outbreaks of septic sore throat and scarlet fever," is misleading unless it be qualified with the explanation that the infecting organisms in such cases must be human pathogens and not the variety commonly found in bovine mastitis. As Brown has expressed it [5]:

> Streptococcal bovine mastitis is very prevalent. It appears in all herds from time to time and is present most of the time in all herds of more than a few cows. The streptococci found in bovine mastitis may be hemolytic or non-hemolytic but there is no evidence that those found in most cases of mastitis are pathogenic for man.

And again,

> The evidence at hand indicates that milk-borne epidemics of streptococcus infection in human beings are caused not by bovine streptococci but by human strains which may become implanted into the udder of the cow. . . . Milk from cows with mastitis should not be used for human consumption, and no person with a hemolytic streptococcus infection should be allowed to handle the udder of a cow.

More and more each year, the attention of those interested in wholesome milk is focused on mastitis and its control. For years the subject has received the attention of veterinary research workers, of medical and other health officials, of dairy bacteriologists and dairy husbandrymen, and of nearly everyone either closely or remotely concerned with milk in any of its phases. It deserves continued study from all angles, for out of the accumulated information we may expect workable methods of control. Much progress has been made and, in the final analysis, veterinary forces will prob-

ably be called upon, as is already the case in many places, to carry out diagnostic, educational and control measures.

In conclusion, it is evident that veterinary service in the control of milk and dairy products embraces wide and varied fields of activity.

Veterinary service includes the application of control and eradication measures to bovine plagues transmissible to man through milk, as exemplified by bovine tuberculosis. This is an example of joint effort under federal-state guidance in which thousands of official and private veterinarians have participated.

The service includes administrative and inspectional duties under state and local health departments in the enforcement of milk sanitary codes, especially with respect to disease control among dairy herds.

Still another branch includes the veterinary service carried on by private and commercial milk organizations in quality control work among milk producers; this phase has proved one of the most effective and beneficial in the development of improved milk supplies.

Finally, but perhaps most important, are the everyday contacts between practising veterinarians and herd owners in maintaining herds on a healthy and, hence, economic basis.

The primary responsibility for control of milk quality as it affects public health rests largely with medical and other officers of established health department agencies. In discharging the responsibility, a considerable share depends upon the utilization of veterinary personnel and coöperation with veterinary agencies. The extent to which veterinary personnel and veterinary agencies are called upon to perform essential services in milk sanitation depends upon the ability and qualifications of the profession in this field.

The basic and specialized training in veterinary science qualifies the profession in one of the most fundamental aspects of milk hygiene, namely, the health of dairy animals. Superimposed on this basic training in our institutions of veterinary education, are courses in hygiene and sanitation, dairy husbandry, the physical, bacteriological, and biochemical properties of milk, and other instruction which should render veterinary graduates especially well fitted to contribute real service in the development of pure milk supplies. It seems essential that such additional training in hygiene and sanitation should be continued and broadened. In this way, veterinarians and veterinary agencies may be even better qualified and more effective in conserving the interests of animal husbandry and public health through pure milk.

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A System of Codification of Medical Diagnoses for Application to Punch Cards, With a Plan of Operation*

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THE system of coding, which is described here, is an attempt to combine in a single scheme provision for two functions, which are related but not identical: first, the cross-indexing of medical conditions, so that medical histories may be obtained from the storage files, in specified groups, for research purposes; second, the issuing of periodic statistical summaries of medical conditions seen during a definite period of time (yearly reports). While, broadly, these two functions can be thought of as parts of a single comprehensive system of keeping account of medical records, practical considerations make it desirable to plan separately for the needs of the two uses. A few examples will serve to clarify the point.

So far as providing that the record of a given case will be available when it is wanted for study of particular subjects, all that need be done is to enter this record under all the relevant categorical headings representing these subjects. If a given set of diagnostic terms is attached to a history, so far as cross-indexing is concerned, one need not attend to the relative importance or certainty of the various diagnoses, but only to the complete entering of the record under all relevant diagnostic phrases. Thus, to give a simple example, if the diagnostic report in a case reads "carcinoma of bronchus?—or possibly thymic tumor" the case should be cross-indexed under both Carcinoma, bronchus and Tumor, thymus. Anybody who later studies either of these conditions should see this history. On the other hand, for the purpose of statistical enumeration, this would be the worst conceivable disposition, for it would lead to a count of two diagnoses, one, carcinoma of the bronchus, and the other, thymic tumor; whereas, the diagnostician did not mean that the individual was suffering from both conditions, but only that he was uncertain as to which one. For statistical purposes one would have to decide to count the case as one of carcinoma of bronchus, or one of thymic tumor, or one of undefined diagnosis. Another point is that for purposes of drawing individual groups of histories, it is desirable to keep account of certain details, which if included in a general statistical report on all cases, will only tend to clutter it up with small groups and cause confusion. For instance, for purposes of cross-index reference, one may wish to keep distinct, cases of "direct inguinal hernia" from cases of "indirect inguinal hernia," and "recurrent hernia" from "nonrecurrent

* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 9, 1935. The scheme here described is modified for more general application from one in use at The Mayo Clinic.

hernia," but these details may be undesirable for a general report. At the same time, provision must be made that a case of recurrent, direct, hernia shall not be indexed in such a way that it is not distinguished from two cases, one with a diagnosis of direct, and another with a diagnosis of recurrent inguinal hernia and so enumerated as two cases. This point assumes the greatest practical importance if diagnoses have been subdivided into refined subvarieties in the scheme of diagnoses used. For instance, if rheumatic heart disease is subdivided into rheumatic pericarditis, rheumatic mediastinopericarditis, rheumatic myocarditis, rheumatic endocarditis, and so forth, then each of these must be given an independent numerical designation.

If, now, a patient presents a combination of these rheumatic cardiac conditions which in general will be the case, there will be several numbers to assign, and the patient will be counted several times instead of once for what is actually a single condition. Finally, and perhaps most importantly, for purposes of drawing out defined groups of histories to be studied, there is no great significance to the particular order in which the records are kept. It makes no difference whether the records of cases of osteomyelitis are obtained from an alphabetical list under the letter O, or from an anatomic ordering under "bone," since all one wishes, is to get the records of cases of osteomyelitis. However, if all the diagnoses are to be enumerated in a consecutive listing, the ordering and groupings of the list have to be such as to make it intelligible. Furthermore, if the list is to be used for comparative studies, the separate rubrics contained in it should be defined on some standard basis. If one is to prepare for the report of all cases, therefore, one has to deal with a fundamental consideration of the designation of defined rubrics, and in what order they should be arranged, that does not even arise in preparing for cross-indexing. These examples do not by any means exhaust the problems involved in adopting a code to both cross-index and summary enumeration purposes, but they will serve to focus the reasons for some of the particular details included in the coding scheme which follows.

PRINCIPLE OF SCHEME

The principle on which the scheme is built is as follows: The function of summary statistical enumeration (yearly reports) is relegated to a numbering system which occupies 3 columns for what I shall call the "main number." In combination with this, I use a numbering system which occupies 2 additional columns for what I shall call the "subnumber," which performs the rest of the functions of the system. The subnumber is coded in a unique way, for certain definite reasons which will be explained later. Each diagnostic condition therefore is represented by a number combination which occupies 5 columns.

The Main Number—Since the main numbers will determine the rubrics and order of the general statistical report, the disposition of these numbers will depend on what order is decided on. The form of such a listing is necessarily always arbitrary. I have used the groupings and order of the *International List of Causes of Death*, not because that list recommends itself scientifically, but because it is the one which has, at present, the widest statistical application. However, it has been modified and amplified to accommodate it to hospital morbidity conditions.*

* It would be highly desirable to establish a standard form for reporting hospital morbidity similar to the *International List of Causes of Death*. The list used by The Mayo Clinic can be obtained upon request.

The Subnumber—The field for this occupies 2 columns. The coding applied to this subnumber does not follow the usual consecutive numbering that would permit 100 consecutive items in the 2 columns used. Instead, a number is assigned to each of the individual 12 punch positions in the 2 columns, giving a total of only 24 possibilities. I call this the "single-punch method of coding." The purpose of this method is to make possible the punching of multiple simultaneous conditions within each main number, in a single punching field. If the usual consecutive numbering system is used, multiple conditions will require multiple fields. In this method the same punching field can be used for multiple conditions within each main number. The following outline will make this clear:

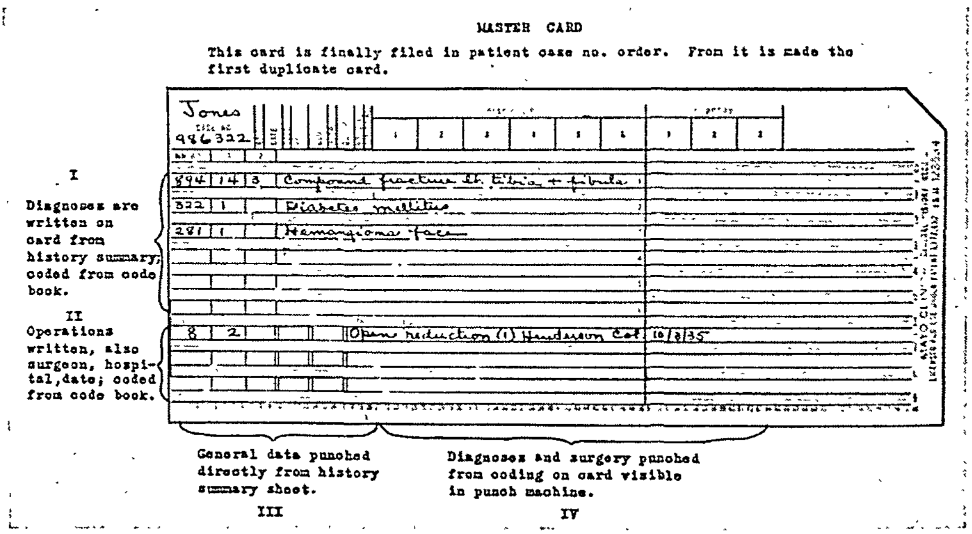
Main number	*Sub-number*	
687	1 —	Inguinal hernia, unmodified
687	— 1	Inguinal hernia, direct
687	— 2	Inguinal hernia, indirect
687	— 3	Inguinal hernia, recurrent
687	—13	Inguinal hernia, direct recurrent

In the last example, direct, recurrent, inguinal hernia is made up by adding the punches of direct and recurrent in the same column, that is, the numbers 1 and 3 are both punched in the second column of the subnumber field. This is possible because only a single punch is used in the subfield for each single specified condition. Advantages of this method are emphasized in the system here described because, as will be explained later, a duplicate card is made for each number punched in a separate field, and by reducing the fields punched it is possible to reduce the number of cards necessary.

OPERATION OF THE SYSTEM

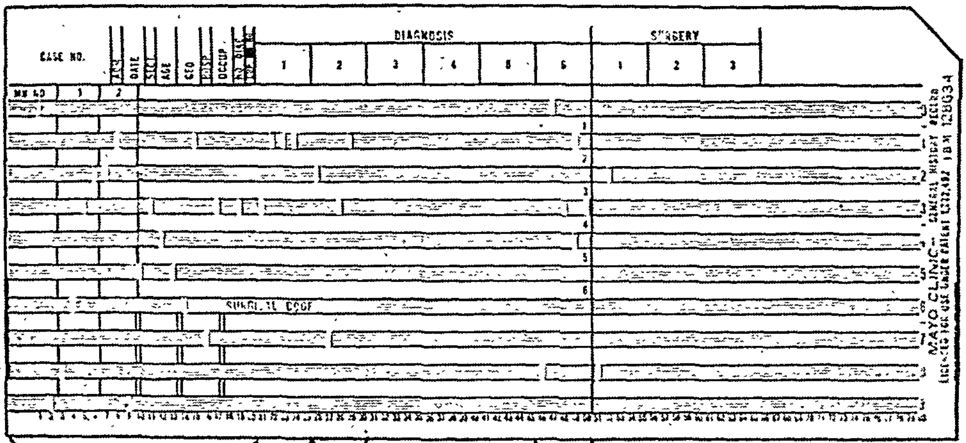
1. *Master Card*—The diagnoses in a given case appear on a summary sheet which the clerk takes up for coding. A special card has been prepared (Figure I) with the punch areas shaded, and between these shaded portions the diagnoses are written in the words given on the summary sheet. A code book alphabetically arranged is provided, and each entry has its code number entered next to it. If the

FIGURE I—A sample master card. The Roman numerals give the order of procedure for completing it.



SECOND DUPLICATE

(The first duplicate is exactly like the Master Card except for the written data.)

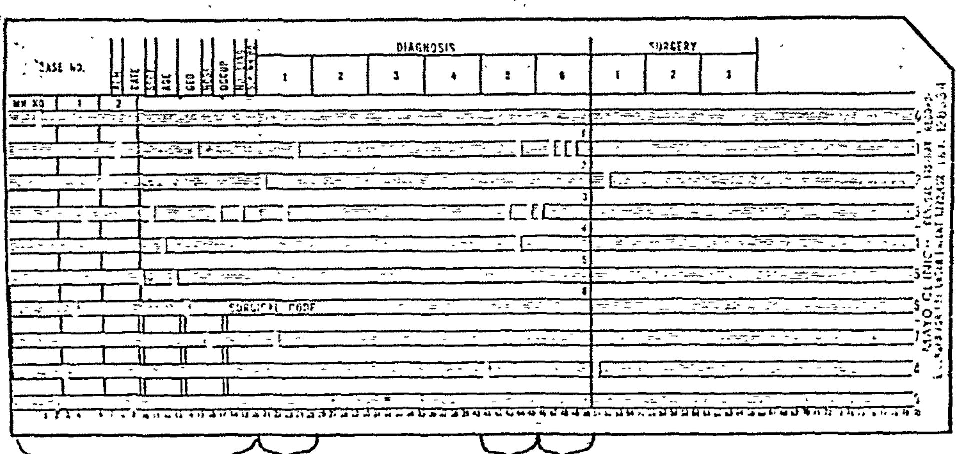


Straight duplication No.2 No.3 No.1

Diagnoses punching shifted.
Diag. No.2 is in position No.1.

THIRD DUPLICATE

This is reproduced from second duplicate.



Straight duplication No.3 No.1 No.2

Diagnoses punching shifted.
Diag. No.3 in position No. 1.

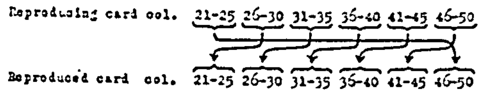
FIGURE II—The second and third duplicates made to complete the cards for the case illustrated in Figure I. Both duplicates are made with the mechanical reproducing punch machine.

condition is one to be included in the statistical summary, an x is punched in the third column of the main number field, in addition to the number shown in the code book. For instance, to take the example previously cited, if the diagnostic sheet says " carcinoma of the bronchus?—or possibly thymic tumor," the numbers for both diagnoses are punched, but only the carcinoma number has the x punched. There is room for 6 such diagnostic fields. When more are necessary, an auxiliary master card is prepared. There is also finally punched, in a column assigned for the purpose, the number of diagnostic fields which have been used; this is to facilitate the preparation of duplicates, which will be described.

2. *Duplicates*—The completion of the punch cards as so far outlined does not render them ready for practical use. It would be impracticable to sort the entire series of accumulated cards each time the records of cases corresponding to a particular diagnosis were wanted. Moreover, since the diagnosis in question might have been punched in any one of the 6 successive fields, all the cards would have to be sorted in that number of fields, a task which would be prohibitive if a large accumulation of cards was involved. Therefore, some system of duplication of cards is necessary.

There are now prepared from each master card, as many duplicates as there have been fields punched, which will be the same in this system of coding, as the number of diagnoses different in respect of the main number. All the master cards prepared as described, are assembled periodically (each week) and from these, duplicates are made on a special colored card. The reproducing machine of the International Machines Co. permits the easy duplication of cards with a transfer of columns. The duplicate is made in such a way that it has the diagnosis for which it is made, in the first diagnostic field, no matter in which field it was punched on the master card (Figure II). To accomplish this, the reproducer is wired so that fields 1, 2, 3, 4, 5, 6 of the reproducing card are punched in the order of 2, 3, 4, 5, 6, 1 on the reproduced card (Figure III).

FIGURE III—The scheme of wiring the reproducing punch machine for punching the duplicates in order to make the pertinent diagnosis appear always in the same columns.



Thus, diagnostic field 2 is shifted to the position of field 1. If 3 or more fields have been punched, the second card is now used as the reproducing card, resulting in the third duplicate having the fields in the order of 3, 4, 5, 6, 1, 2; thus the third field is shifted to the position of field number 1. This is continued progressively for as many fields as occupied.* This procedure is actually extremely easy, because the number of diagnostic fields occupied on the master card has been punched in a special column, and the master cards are first sorted on this column to determine how many duplicates are to be made. I have found that about 1,500 master cards can be duplicated, sorted, and filed in less than 2 hours.

3. *Filing of Cards*—When the duplicating process is completed, we have the master cards and the duplicates to file. The master cards are ordered on the patient case number (not diagnoses), and are placed in a file in this order. Here are kept, in patient number order, consecutively, all the master cards with all the diagnoses written on them. The duplicate cards are ordered

* Where more than 6 diagnoses have appeared on the summary sheet, an auxiliary master card has been made, so that the operation of making duplicates is the same.

on the 3 columns of the main number in the first diagnostic field (all the relevant diagnoses are now in the first field on the duplicates) and are placed in a file of duplicates, each set of cards corresponding to a particular main number behind a tab card bearing this number.*

4. *Utilization of Cards After Filing*—Cross-index. If one is concerned with obtaining, for research reference, the case number of histories corresponding to, say, indirect inguinal hernias, which were recurrent, one determines the number for this, which is 687—13. All the duplicates under tab number 687 are removed from the file, and by using the selecting mechanism of the sorting machine, the cards with punches 1 and 3 in column 5 are selected. The selected cards are now ordered on patient case number, and by using the "controlling" device of the tabulator, a list is obtained of case numbers in order, each case appearing only once no matter how many duplicates (visits) this patient has made. At the same time, a count of patients (control count) and visits (card count) is obtained if desired.

Report. For a periodic summary enumeration, one goes to each set of duplicates consecutively from main number 001 forward, and in each group, first sorts on column 3 of diagnostic field 1 to obtain the x cards (those to be reported). The selected cards are then ordered on patient case number, and are run through the tabulator for a "controlled" count (to obtain a count of each patient only once). The main numbers which represent the rubrics used for summary report purposes and totals are printed on the tabulator print sheet consecutively, so that this sheet need merely be copied to give the final summary report.

* In sorting the duplicates, I have arranged to sort with them a specially prepared tab punch card with the number printed on the tab so that the duplicates after ordering are conveniently separated by these marked tabs and easily filed.

SUMMARY OF PROCEDURES

1. On registration of a patient, a blank master card is filled in with name and patient number and placed in a file, awaiting the dismissal of the patient. This is merely a check to prevent the missing of histories.

2. After dismissal of patient, the history of the case is sent to the indexing department, where the previously prepared master card (see 1) is removed from the waiting file. On this card, a clerk copies in appropriate spaces the diagnoses and operations; and then codes these on the same card from an alphabetically arranged code book (Figure I).

3. History and master card go to a second clerk who independently checks the coding.

4. The master card is taken up by a punch clerk who punches from the summary sheet of the history, general data (columns 1 through 20). The coding of the diagnoses and operation (see 2) on the card in the punch machine is now visible to the punch clerk, and from these the punching is completed (columns 21 through 65). The number of diagnostic fields occupied is also punched (column 19).

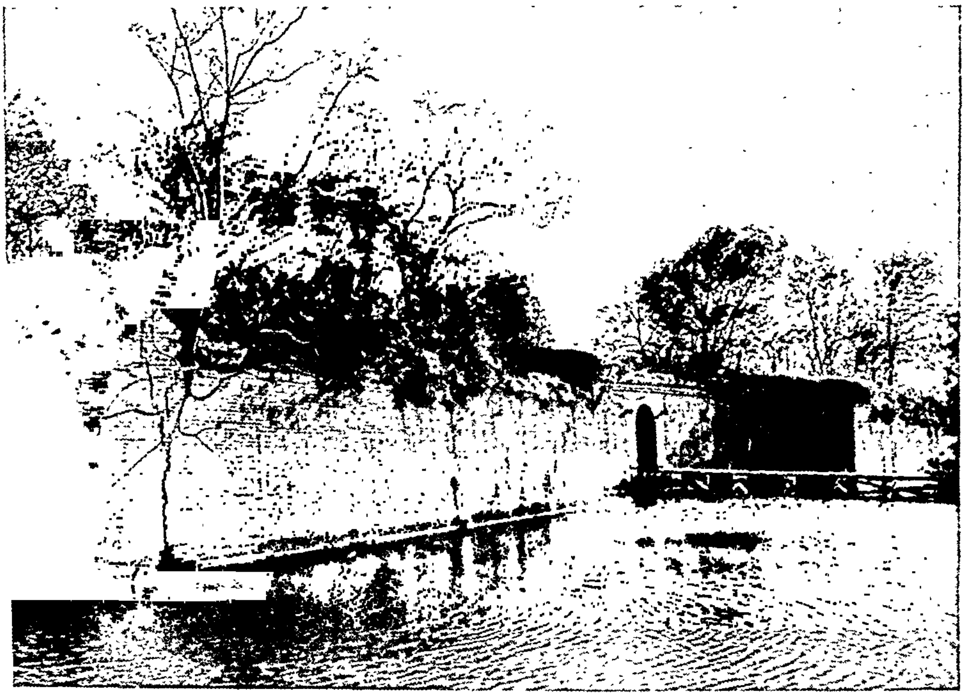
5. The history and master card pass to a checking clerk who independently punches the first duplicate from the notes on history and the coding on the master card. The card is light-checked by this clerk with the original master card. This step is included as a check on punching. These two cards later are checked again for punching, by running them through the checking device of the reproducing machine.

6. The accumulated first duplicates are sorted on the previously punched number of duplicates (column 19) into groups requiring 2, 3, 4, 5, 6 duplicates. Each of these is run through the

duplicating machine the required number of times. For the cards having six diagnoses, for instance, the second duplicate makes the third; the third, the fourth; and so forth, until the sixth is complete.

7. The master cards are sorted on patient case number and then filed.

8. The duplicates are sorted with inserted tab punch cards on the main number of the first diagnostic field (column 20 through 22). This groups them in main number order and they are so filed.



Old Fort Macomb, formerly Fort Woods—Located on the Old Spanish Trail 22 miles east of New Orleans at Chef Menteur. Built in 1842 on land which was formerly the property of the King of France. This great mass of embattled brick with all the typical accoutrements of an ancient stronghold of war, with turrets and moats and drawbridges, is one of a considerable number of old forts to be found in the vicinity of New Orleans.

Industrial Sanitation as a Public Health Engineering Activity*

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THE Committee on Industrial Hygiene of the Conference of State Sanitary Engineers in 1932 canvassed their membership to learn the status of work in industrial hygiene done by the various states. From the data condensed into their report [1] and from subsequent inquiries it is evident that the engineering branch of industrial hygiene, which we are calling industrial sanitation, could almost be appropriately described as a public health engineering inactivity. "Industrial sanitation" is intended to mean primarily the measurement and control of environmental conditions of atmosphere, illumination, and protection against toxic or devitalizing exposures, and not primarily the sanitary engineering specialties of water supply and disposal of wastes as applied to industry.

Connecticut has perhaps the only state department of health in which industrial sanitation is beginning to be at all adequate. *Public Health Bulletin 184* (1932) [2] gave the appropriations for the 4 states having separate bureaus or divisions of industrial hygiene. At that time the Connecticut bureau had an appropriation twice as great as that for any of the other 3 states, and it has since made an addition to the personnel working at industrial sanitation. Its growth to meet a demand justifies the department's article [3] on the necessity for the bureau.

Industrial sanitation is to some extent an activity of a few state departments of health not having special bureaus. Certain large cities are beginning to carry out programs, as may be learned, for example, from the publications of the Baltimore Department of Health. Departments of labor in a few states have divisions devoted to industrial sanitation, and individual industries have made noteworthy progress.

Nevertheless, widespread application of the technical knowledge of industrial sanitation which has been amassed in quite recent years has lagged. No great elaboration is required to convince members of this organization that its application is needed, but should they desire to present the case to others, a few additional references may prove valuable.

Dr. Jirka [4] has summarized the scope of the problem, and statistics showing the need of control measures, including the appalling statement that workers, because of industrial hazards, have 5 years cut from their average life span as compared with those of similar economic status employed in non-hazardous occupations.

Bloomfield and Johnson [5] conclude from a study of a typical industrial area that a constructive program of industrial hygiene should be established in the department of health.

* Read before the Public Health Engineering Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 10, 1935.

The 615 plants surveyed showed exposure to 39 different materials and conditions which involved possible systemic poisoning. Inorganic dusts, carbon monoxide, and lead were the most important hazards, all of which are amenable to engineering attack.

These are recent examples from a growing body of literature confirming the need of the work. Why has this need not been met?

That appropriations have been inadequate is not a full answer. It remains not only for pioneers to demonstrate that appropriations are justifiable before the movement can spread on a broad front, but also for a number of departments to take it up successively and show that the program is generally applicable. At present this appears to be progressing slowly.

In some cases appropriations can be obtained when it is shown from experience elsewhere that the need exists and that means are available for meeting the need with real accomplishment. In other cases it is incumbent upon health departments to make a start and demonstrate what can be done with existing appropriations and by existing divisions.

Whether appropriations are to be sought, or a program, however modest, is to be initiated to demonstrate the possibilities, it is the province of the public health engineers attached to the departments to advance the movement. Industrial sanitation is so peculiarly an engineering problem that its widespread advancement has lagged for want of engineering initiative, because the medical direction of the engineering aspects of industrial hygiene cannot be advanced without engineering assistance.

This brings us to the point of this paper, namely, that progress has been retarded because public health engineers have been too preoccupied with sanitary public works projects during an abnormal period of readjustment to have been able to keep up with the advancing knowledge of industrial sanitation in its scattered and largely undigested form. This is especially true in departments where the only public health engineers are sanitary engineers not grounded in industrial sanitation, lighting, ventilation, etc., as recommended by the Committee on Qualifications of the Conference of State and Territorial Health Officers.[6]

It is to these latter engineers that this paper is particularly addressed, for we hope to show how sanitary engineers may extend their work to include industrial sanitation. The nature of their fundamental training and experience fits them for such work; it is only a matter of application of new variations of old principles.

While these variations are numerous in the multiplicity of hazards encountered, the majority fall within a few groups. This makes it possible for a few sets of apparatus and procedures for sampling and determinations to cover a large proportion of the problems in practice, and possible for a relatively small variety of remedies to reduce most hazards.

Taking the typical industrial area mentioned, where inorganic dusts, carbon monoxide, and lead were the most important hazards, the attack would be started by the usual qualitative inspections, followed by such determinations of concentrations of these contaminants in the workroom atmospheres as appeared desirable.

The Greenburg-Smith impinger would serve to sample either the dust or the lead. If this sounds unfamiliar to the sanitary engineer, let us say that the determination for lead consists of the blowing of a measured quantity of lead laden air through water against a surface and analyzing the water.*

* An analysis for lead developed by Howard[7] in New Hampshire, due to simplicity of manipulation, is more fool-proof than the standard methods.

It would not take long to train someone to make determinations for dust or lead, nor to do the sampling and determination for carbon monoxide. The greatest hurdle for the sanitary engineer has been taken when he has obtained a list of apparatus needed and a working outline of standard procedure. We will come to the selection of these definite items from the maze of literature.

Next, where the fairly definite standards established for maximum allowable concentrations of these substances are exceeded, the correction demands that the public health engineer outline to the manufacturer what is practicable. In some cases manufacturing processes can be modified to suppress generation of an excess of the contaminant; for example, dust may be wet down as it forms, or hoods may be installed to collect it before it diffuses into the air. Improvement of general ventilation may be indicated, and much may be accomplished by good "housekeeping." Uncontrollable contamination may demand as a last resort that respirators be worn.

The control or modification of the process, the collection and exhaust of the contaminant, the improvement of ventilation or "housekeeping," and the determination whether the respirator is effective involve the same principles that sanitary engineers apply to the treatment of water and wastes.

Industrial hygienists might at this point notice an incompleteness. But we are confining our exemplification to industrial sanitation, stopping where it begins to overlap the phases which belong under immediate medical direction.

Full fledged experts in industrial sanitation should be attached to departments of health, but until they are procurable, we believe that public health engineers in most departments should, and could, initiate and carry out programs, notwithstanding the fact that such extension involves the work of years rather than of months, and that an approach without a full course of special training demands that branches of the work be mastered and applied one by one.

During the present plastic stage of the art, certain aids would be of immense assistance to public health engineers. Visits by experts of the U. S. Public Health Service for the express purpose of instruction in programs and technic would be invaluable. Intensive courses in industrial sanitation planned like the 2 weeks' courses given to health department personnel at the U. S. Public Health Service Stream Pollution Station in Cincinnati are needed. If such courses were confined to procedures which have proved practicable, omitting alternative methods, methods infrequently encountered, and general instruction in non-engineering phases of industrial hygiene or its administration which could be read up at leisure, engineers receiving the instruction could be equipped to undertake a considerable variety of original investigations.

We would also suggest that a committee of this Association might be appointed to compile a manual of industrial health engineering practice as was done for water works by the American Water Works Association, and this is something that need not necessarily be delayed for want of means of financing.

If selected contributors could be recruited among technicians of bureaus of industrial hygiene, industrial hygienists of insurance companies, industrial chemists, research workers, and faculties of schools of public health, etc., it should be possible to assemble an eminently practical manual from knowledge already available, despite the fact that much of the so-called "engineering" practice has yet to be put on a scientific basis, as is instruc-

tively shown by Hatch[8] in the case of dust control. The manual could be confined to practical working information on industrial sanitation, could omit other aspects of industrial hygiene, and could exclude, but refer to, material already in accessible form in a few publications which those using the manual would be expected to own. By so confining its bulk, the task should not prove too formidable. One publication in particular, the 2,300 page *Encyclopaedia of Hygiene, Pathology and Social Welfare,* should be in the possession of industrial sanitarians, and on the assumption that those going into the subject seriously would obtain it, the bulk of our manual could be kept down by avoiding repetition of its contents. Turner[9] declares this encyclopedia of industrial hygiene to be the most complete and reliable reference work of its type. But it does not preclude the necessity of a practical working manual.

Among the few other publications that such a manual might refer to rather than repeat may be mentioned the bulletin *Determination and Control of Industrial Dust,* by Bloomfield and Dallavalle.[10] There is no reason for such a manual to duplicate the contents of a standard textbook, and we understand that the first one on dust is under preparation by Drinker and Hatch, of the Harvard School of Public Health.

Such a manual could fulfil the lack of assembled information in giving working directions for analytical determinations of concentrations of various substances in air, with diagrams of apparatus, methods of calibration, tabulations of threshold concentrations, substitutes for hazardous substances and for what processes their use is practicable, known modifications that could be applied to unsatisfactory processes, design data on actual installations for exhaust and ventilation systems and their performances, data on actual practice in progressive industries where hazards are guarded against, etc. A fund of unpublished information could doubtless be ferreted out by a coöperative effort among a well selected group of contributors.

We agree with the opinion of Cook[11] that no one has prepared a treatise on industrial health engineering because it would grow obsolete faster than an individual could prepare it. Therefore, a condensed manual prepared by a committee appears to be the logical solution.

Public health engineers have the choice of attending to the development of industrial sanitation or seeing this work established by engineers in departments of labor. For instance, the Division of Occupational Hygiene of the Massachusetts Department of Labor and Industries was recently created, as described before the section on occupational diseases at the Massachusetts Safety Conference[12] in 1935.

This trend represents a good development through the wrong channels. Engineers developing industrial sanitation in departments of labor have not the medical, technical, and laboratory facilities to support them that are available in departments of health. Industrial sanitation aims to elevate health and is a natural part of the public health organization of the country. Its objectives should come under constant medical scrutiny without which it can have no intelligent objectives. The work should be evaluated under medical supervision in order that its cost may be apportioned properly in relation to other public health activities. To disjoin an important branch of technical work from a public health organization detracts from the strength and value of that organization and offers no compensating advantage. The position of state departments of health between federal, on the one hand, and county, municipal, and local departments of

health on the other, together with their accustomed coöperation in all aspects of health control, makes the department of health the logical organization to supervise this work in the interests of efficiency.

While industrial sanitation is a tool of preventive medicine and should be so organized, we believe there is a strong reason why engineers should head divisions prosecuting this work under departments of health in coöperation with medical experts in industrial hygiene rather than as subordinates to them. The reason is simply that its importance and difficulty demand able engineers, and you will not, in the long run, find many engineers of outstanding ability in subordinate positions in departments of health, if competition for leadership is denied them.

This paper could have come to a logical end on this note had we not already sent the Association an abstract stating that two other items were discussed: (1) The expansion of sanitary engineering activities in an industrial state to include industrial sanitation as a forerunner to the creation of a separate bureau; and (2) Legislation which was introduced to establish an adequate industrial inspection service jointly by the Rhode Island Departments of Labor and of Public Health.

Our activities are proceeding along lines advocated herein. While it has been impossible as yet to carry out an adequate program, we have done a considerable variety of work in industrial sanitation in the past 3 years, and have come to be called upon so frequently that if legislation is not obtained soon to establish the work on a recognized footing it will have been established by precedent.

This was made possible by the addition in 1931 of a second assistant sanitary engineer to our personnel and by other sympathetic and material assistance by those in a position to dispense such things.* Our ability to attack such problems as arise has been dependent in no small degree upon the advice available from the Harvard School of Public Health, the Connecticut Bureau of Occupational Diseases, the U. S. Public Health Service, and the National Safety Council.

Finally, as to our legislation—Acting under authorization of the Director of Public Health, legislation was prepared in coöperation with our legally trained Director of Labor and introduced before the close of our last session.

It was aimed to create a bureau in the Department of Public Health with a nucleus of trained personnel and enlarged laboratory facilities, which would devote full time to industrial sanitation. Conjointly it was aimed to create a bureau in the Department of Labor with a nucleus of trained personnel who would coöperate with the Department of Public Health, have access to their laboratory facilities, and who would exert a technical educational influence on the non-engineering portion of the inspectional staff of the Department of Labor. It was specified that the data or reports of the bureau in the Department of Public Health could not be used in court, since it was desired to keep this bureau on a solely advisory basis, which, as attested by Gray,[12] is of great importance if the full coöperation of manufacturers is to be had. At the same time, it would be understood by manufacturers that bad conditions might be referred to the Department of Labor for the obtaining of evidence to be used in the enforcement of laws. This attempt to provide both the benefits of a bureau confined to advisory service and an enforcement agency which would be able to obtain

* The Rockefeller Foundation provided a fellowship covering attendance at the courses in industrial hygiene given by the Harvard School of Public Health.

the technical evidence needed departs from the precedents offered by the two states adjacent to Rhode Island.

We expect to continue the expansion of activities in industrial sanitation and are hopeful of successful action on the legislation this winter. Passage of such legislation has been recommended by our Governor.

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NOTE: The numbered references given have been selected so as to include recent and available matter which, with the obvious exception of the encyclopedia, could be read to advantage by engineers who may extend the efforts of their divisions into industrial sanitation but who have not hitherto familiarized themselves with the subject.

There is as yet no textbook in the form of a treatise on industrial sanitation, but in Rosenau's *Preventive Medicine and Hygiene,* 6th edition, New York, 1935, two sections form an admirable brief text, Section VII on Air, and Section XIV on Industrial Hygiene and Diseases of Occupation.

For a description of practical application, see the annual reports of the Bureau of Occupational Diseases of the Connecticut State Department of Health since 1927, or, for its administration, see "The Administration of Occupational Disease Control," by Albert S. Gray, M.D., *Safety Engineering,* Vol. 68, p. 251 (Dec.), 1934, and Vol. 69 (Jan.), 1935.

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For an outline and forms for surveys see "Preliminary Surveys of the Industrial Environment," by J. J. Bloomfield, in *Public Health Reports,* Vol. 48, No. 44, p. 1343 (Nov. 3), 1933.

Cultural Methods of Isolation of Tubercle Bacilli*

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IN a previous report[1] we outlined the results obtained in a comparative study of cultural and animal inoculation tests carried out on 343 specimens of sputum. As the cultural examination was found to be more sensitive, and as it is free from disadvantage of test animals dying from intercurrent infection, we decided to extend our cultural study to all specimens received upon which an animal test was requested. The routine followed was a cultural examination on sputum specimens and a cultural and animal inoculation test on all specimens of pleural fluid, ascitic fluid, joint fluid, and glandular material.

METHOD OF PROCEDURE

Pure cultures of *M. tuberculosis* can be isolated or obtained directly from tuberculous material, if the tubercle bacilli are present in sufficient numbers and mixed infections are not present, by using the proper blood serum or egg culture medium. If organisms other than tubercle bacilli are present, and as these organisms grow more rapidly than tubercle bacilli, the specimen must be treated preparatory to culture.

METHOD OF TREATMENT

Several methods of treating specimens have been tried in the Ontario Department of Health Laboratories. We have found the low grade acid treatment for 2 hours, with subsequent neutralization by the addition of 3 per cent sodium hydroxide solution, to be the most satisfactory method tried to date. The procedure briefly is as follows:

1. The specimen when received is placed in a sterile 6 inch test tube, care being taken to deliver it to the bottom of the tube. Every precaution should be used to prevent as far as possible contaminating the side of the tube. The neck of the tube is well flamed and a sterile cotton plug is inserted.
2. Equal parts of 3 per cent hydrochloric acid containing bromcresol indicator is added to the specimen. Should there only be a sedimented specimen, 5 c.c. of this reagent is added. This acid solution is 3 per cent of the concentrated hydrochloric acid, and is not 3 per cent hydrogen chloride.
3. After the addition of the 3 per cent hydrochloric acid solution to the specimen, the tube is shaken by a side to side motion, and the upper portion of the tube is well flamed to within an inch of the upper level of the liquid. A fresh sterile cotton plug is inserted in the tube.
4. The specimen is left at room temperature for 2 hours, after which time it is neutralized by the addition of 3 per cent sodium hydroxide (pH 7.0). This reagent is added aseptically in the tube.
5. A rubber cap is placed over the tube in order that the cotton plug will be held in place. The neutralized specimens are then centrifuged at high speed for ½ hour.
6. After centrifugation, the supernatant fluid to within ½ inch of the sediment is withdrawn by means of a suction apparatus, which is attached to a rubber tubing on a flask containing phenol 5 per cent.
7. By means of a platinum loop, a beef infusion broth culture is planted with a loop-

* Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

TABLE I

NUMBER AND PERCENTAGE POSITIVE ON PETRAGNANI'S, PETROFF'S AND WOOLLEY'S MEDIA, SERIES NO. I

	Pgn. Pet. Wol.	*Pgn. Pet. Only*	*Pet. Wol. Only*	*Pgn. Wol.*	*Pgn. Only*	*Pet. Only*	*Wol. Only*	*Totals*
Sputa	2	9			3	2	1	17
Urines	8	23	2	3	5	2		43
Right and Left Ureter		2			2	1		5
Pleural Fluids	10	13			4	1		28
Joint Fluids	3	2						5
Pus	5	15		3	3	3		29
Miscellaneous	2	1						3
Totals	30	65	2	6	17	9	1	130
Percentage positive on each medium	23.0	50.0	1.5	4.6	13.0	7.0	0.9	100

Pgn. = Petragnani's — Petragnani's positive on 90.6% of the specimens.
Pet. = Petroff's — Petroff's " " 81.5% " " "
Wol. = Woolley's — Woolley's " " 30.0% " " "

TABLE II

NUMBER OF SPECIMENS EXAMINED IN SERIES NO. I

	Total No. of Specimens	*No. of Positives* at 4 Weeks	*No. of Positives* at 8 Weeks	*Total*	*No. of Negatives*	*Percentage of Positives*
Sputa	683	17	13	30	653	4.39
Urines	523	45	15	60	463	11.47
Right and Left Ureter	179	8	3	11	168	6.14
Pleural Fluids	206	32	10	42	164	20.38
Joint Fluids	54	8	2	10	44	18.52
Pus	108	32	12	44	64	40.74
Miscellaneous	73	4	0	4	69	5.48
	1,826	146	55	201	1,625	11.00

TABLE III

SPECIMENS ON WHICH CULTURE WAS CONTROLLED BY GUINEA PIG INOCULATION IN SERIES NO. I

	Total Number	*Guinea Pigs* Negative	*Guinea Pigs* Positive	*Cultures* Negative	*Cultures* Positive
Right Ureter	90	85	5	83	7
Left Ureter	89	84	5	85	4
Urine	139	125	14	120	19
Pleural Fluid	136	114	22	106	30
Sputum	9	7	2	8	1
Pus	81	53	28	48	33
Joint Fluids	49	39	10	40	9
Miscellaneous	49	47	2	47	2
	642	554	88	537	105

TABLE IV

SPECIMENS ON WHICH CULTURE WAS POSITIVE AND GUINEA PIG INOCULATION NEGATIVE, OR VICE VERSA

Type of Specimen	*Culture Positive Guinea Pig Negative*	*Culture Negative Guinea Pig Positive*
Right Ureter	1	0
Left Ureter	1	2
Urine	10	0
Pleural Fluid	9	2
Sputum	0	1
Pus	6	2
Joint Fluids	1	2
Miscellaneous	0	0
	28	9

ful of material from each specimen. These broth cultures are incubated at 37° C. for 24 hours, and then examined for turbidity in the liquid. These broth cultures indicate whether or not all extraneous organisms have been destroyed in the treatment process.

8. All the specimens showing no growth on the broth are then planted by a sterile capillary pipette on various types of media suitable for the primary growth of tubercle bacilli.

CULTURAL PROCEDURE

In our first series, a platinum loop was used in seeding. At least 3 or 4 loopfuls were placed on each slant. In the second series, a capillary pipette was used. At least 3 drops of the treated sediment are placed in each tube. After seeding, the upper portion of the culture tube is flamed, the cotton plug ignited, and inserted in the tube. A rubber cap, boiled for 15 minutes, is placed over the end of the tube. The specimens are incubated at 37° C. for 8 weeks. The cultures are examined after 4 weeks. Cultures showing visible growth are examined, smears prepared, examined, and reported. Others are incubated for a further 4 weeks.

TABLE V

TUBERCULOSIS CULTURES

NUMBER OF SPECIMENS POSITIVE AT 4 AND 8 WEEKS AND THE TOTAL PERCENTAGE OF POSITIVES ON VARIOUS TYPES OF SPECIMENS

	Total Number of Specimens	*Number of Positives at 4 Weeks*	*Number of Positives at 8 Weeks*	*Total Positive*	*Number Negative*	*Percentage of Positives*
Sputa	1,101	41	18	59	1,042	5.35
Urines	604	48	12	60	544	9.93
Right Ureter	114	11	2	13	101	11.40
Left Ureter	101	2	4	6	95	5.94
Pleural Fluid	187	25	7	32	155	17.11
Bone and Joint Fluid	50	9	4	13	37	26.00
Pus	96	27	7	34	62	35.41
Miscellaneous	76	1	3	4	72	5.26
	2,329	164	57	221	2,108	
Percentage Positive		74.2	25.8			9.49

Guinea Pigs Positive, Culture Negative 17, Total Positive 238, Total Per Cent Positive 10.2

TABLE VI

TUBERCULOSIS CULTURES

NUMBER AND PERCENTAGE POSITIVE ON PETRAGNANI'S, LOWENSTEIN'S, WOOLLEY'S AND LOWENSTEIN'S SILICA MEDIA

	Pgn. Lwn. Wol. L.S.	*Pgn. Lwn. Wol.*	*Pgn. Wol. L.S.*	*Pgn. Lwn. L.S.*	*Lwn. Wol. L.S.*	*Pgn. Lwn.*	*Pgn. Wol.*	*Pgn. L.S.*	*Lwn. Wol.*	*Lwn. L.S.*	*Wol. L.S.*	*Pgn.*	*Lwn.*	*Wol.*	*Lwn.S.*	*Totals*
Sputa	25	2	2	3	5		2	2			1	3	6	5	3	59
Urines	37	5	1	4		2	1	1	1	1		1	4	1	1	60
Right and Left Ureter	8	2		1	1	1	1			1			2	1	1	19
Pleural Fluid	18	1		1	4	2		1	1		1		1	1	1	32
Bone and Joint	8	2					1						1		1	13
Pus	25	1			1	2	1		1	1			2			34
Miscellaneous	3								1							4
Totals	124	13	3	9	11	7	6	3	4	3	2	4	16	8	7	221
Percentage Positive on each Media	56.1	5.9	1.4	4.2	4.9	3.1	2.8	1.8	1.8	1.4	0.9	1.8	7.2	3.6	3.1	100.0

Petragnani's positive on 170 or 76.9%
Lowenstein's positive on 187 or 84.6%

Lowenstein's Silica positive on 163 or 73.7%
Woolley's positive on 171 or 77.4%

CULTURE MEDIA USED

A number of media have been proposed. In connection with our work, the following media have been used:

1. Lowenstein's
2. Lowenstein's with silica
3. Modified Petroff's
4. Petragnani's
5. Woolley's medium with and without glycerine
6. Feldman's modification Herrold's medium
7. Dorset's
8. Modified Dorset's
9. Lowenstein's and Petragnani's medium to which silica has been added

STUDIES MADE

From October 1, 1932, to June 30, 1933, each specimen was planted on 2 modified Petroff's, 2 Woolley's, and 2 Petragnani's culture tubes. From July 1, 1932, to January 1, 1934, these were supplemented by 2 Lowenstein's, 1 Petragnani's containing 1 per cent sodium silicate, and 2 Woolley's slants without glycerine. Of the media used, Lowenstein's and Petragnani's yielded the greatest number of positives.

Table I shows the number and percentage of positive cultures obtained from each of the 3 types of medium used. Petragnani's media gave the most positives, and Woolley's least. Woolley's media showed a rather high percentage of contaminated tubes. When malachite green is added to this medium, instead of crystal violet, it yields very satisfactory results.

Table II shows the number of specimens examined in Series No. I.

Of 1,826 specimens examined, 201, or 11 per cent, were positive, of which 146 were found positive in 4 weeks, while 55 required 8 weeks' incubation.

Specimens on which culture was controlled by guinea pig inoculation, in Series No. I—Table III shows the results obtained in examining 642 specimens by both the culture and animal inoculation. The cultural test yielded

TABLE VII

TUBERCULOSIS CULTURES

629 SPECIMENS ON WHICH CULTURAL TEST WAS CONTROLLED BY GUINEA PIG INOCULATION

	Total Number	Guinea Pigs		Cultures	
		Negative	*Positive*	*Negative*	*Positive*
Right Ureter	114	101	13	101	13
Left Ureter	101	95	6	95	6
Urine	164	134	30	135	29
Pleural Fluid	79	63	16	64	15
Sputum	1	1	0	1	0
Bone and Joints	43	34	9	33	10
Pus	78	52	26	53	25
Miscellaneous	49	43	6	45	4
	629	523	106	527	102

105 positives, and the animal inoculation 88.

Specimens on which culture was positive and guinea pig inoculation negative, or *vice versa*—Of the 642 specimens included in this comparative study, 28 yielded positive cultural results, while the animal inoculation yielded 9. Animal inoculation yielded positive results in the case of 1 ureter, 1 joint fluid, and 1 sputum, in which cultures were negative.

During 1934, the media used was Lowenstein's, Lowenstein's with silica, Petragnani's and Woolley's with and without glycerine. Feldman's media was tried, and Woolley's media with phosphate buffer. We discontinued the use of modified Petroff's, as it had no advantage over Woolley's and was less efficient than either Lowenstein's or Petragnani's. In addition, a further cultural test was made on 302 specimens, using Lowenstein's, and Dorset's containing sodium silicate.

A second cultural study was made on 226 specimens in which 4 different silicates were added to Petragnani's medium. The result of this work is as follows: During the year 1934, the animal inoculation test was carried out, using a portion of the untreated specimen, while in 1933, the test animals were inoculated with a portion of the treated specimen.

Table V shows the number and

TABLE VIII

ANALYSIS OF COMPARATIVE TESTS

SPECIMENS ON WHICH EITHER CULTURE OR GUINEA PIG WAS POSITIVE

Type of Specimen	*Culture Positive Guinea Pig Negative*	*Culture Negative Guinea Pig Positive*
Right Ureter	4	4
Left Ureter	0	0
Urine	2	3
Pleural Fluid	1	2
Sputum	0	0
Pus	2	3
Joints and Bone	4	3
Miscellaneous	0	2
	13	17

nature of specimens examined during 1934. Of 2,329 specimens cultured 9.49 per cent were positive, of which 74.2 per cent were found positive in 4 weeks, and 25.8 per cent after 8 weeks.

Table VI shows the results obtained in using Petragnani's, Lowenstein's, Lowenstein's silica, and Woolley's medium.

Table VII outlines the results from 629 specimens cultured and inoculated.

Table VIII shows that in Series No. 2 cultures were positive in 13 instances in which animal inoculations were negative, while animal inoculations were positive in 17 instances in which the cultures were negative.

SUMMARY

Cultural examination for the primary isolation of tubercle bacilli was carried out in 2 series, which include all the routine specimens received at the Central Laboratory, Ontario Department of Health, during 1933 and 1934.

For 1,826 specimens, Petragnani's, modified Petroff's, and Woolley's media were used routinely. Dorset's and modified Dorset's media were tried, but found inferior, and their use was discontinued. Of the 3 media used, Petragnani's yielded the greatest number of positive results (Table I). On 642 specimens, the cultural examination was controlled by animal inoculation. Cultures were obtained from 105 specimens, while 88 produced typical tuberculosis in animals, inoculated with 1.5 c.c. of the treated sediment.

For 2,329 specimens, Lowenstein's medium with and without sodium silicate, Petragnani's and Woolley's medium with and without glycerine, were used throughout the series. Feldman's medium was tried, but was not as satisfactory as the others, and was discontinued. Of the media, Lowenstein's gave the most positives (Table VI), of which 74.2 per cent were visible in 4 weeks.

In a further comparative study of cultures and animal inoculations on 629 specimens, the animals gave positive results for 4 more specimens than the cultures. The animals were inoculated with 1.5 c.c. of the untreated specimen.

CONCLUSIONS

1. Cultural examination for the primary isolation of tubercle bacilli has been found to be equally as sensitive as the animal inoculation test.
2. The cultural examination is free from the disadvantage of test animals dying from intercurrent infections. In 77.2 per cent of the positives a report was available in 4 weeks.
3. Our results indicate that on specimens other than sputa and chest fluids, both a cultural and animal inoculation test should be carried out.
4. The results obtained indicate that further studies on suitable cultural media and animal inoculation tests should be carried out.

REFERENCE

1. *Canad. Pub. Health J.* June, 1932.

Integration of the School Health Program with Community Health Education*

V. S. BLANCHARD

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ONE of the most significant changes that have become evident because of the economic upheaval in recent years is the interest which the community has taken in the public school system. This interest has not always been completely altruistic, but it has caused the schools to take inventory, criticise their curricula, and analyze their programs in the light of their contributions to the community.

Has the school health program of the past been integrated with community health education? Before attempting to answer that question and before venturing any suggestions as to present or future integration there should be a clear understanding as to what constitutes a school health program and how we are to define community health education.

Any successful school health program must concern itself with three distinct factors: (1) healthful school living, (2) health service, and (3) health instruction. Furthermore the content of the program must be adapted to the age level of the child, that is, whether he be in the elementary, junior high, or senior high school. There are some differences of opinion among school people as to just what should constitute the specific programs on these three different levels. The ones cited here seem to be meaningful and in accord with present-day educational concepts.

Health work in the elementary schools should consist of a program built around the child's everyday school experiences. It should aim toward the inculcation of health attitudes and health habits with as much actual health teaching as is consistent with the elementary school child's ability to absorb it.

The junior high school program may combine some of the work on the elementary level with one period a week devoted to definite health instruction as outlined by a course of study supplemented with textbooks.

Presupposing that such a program as briefly outlined is operative in the elementary and junior high school, the senior high school student should be given an opportunity to appraise his own health needs and be given guidance and help in meeting them.

What aspects of such a school program as this may be carried over into the community, and how may the community supplement such a program with its health education program? Again to answer this there must be a clear understanding of what constitutes com-

* Read at a Joint Session of the American Association of School Physicians and the Public Health Education and Public Health Nursing Sections of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 10, 1935.

munity health. Community health consists of the coöperation of the citizens in the community; a safe milk supply; an adequate pure water supply; careful food inspection; sanitary disposal of city waste, garbage, and sewage; protection against communicable diseases; mental hygiene; and lastly but increasingly imperative, education in health.

Too little emphasis has been placed on education in health, both in our schools and in the community. Too much emphasis has been placed on health service in our schools with the result that boys and girls have been graduated from high schools totally ignorant of how to meet their health problems as they arise. The home, the most vital place in the welfare of the community, has waited for the child to go to school to get a health check-up. The school has examined the child, made some spasmodic and sporadic attempts at following up defects, and then has set him loose on the community to duplicate later the mistakes of his mother and father.

It is one of the jobs of the school to see that boys and girls are thoroughly familiar with community health problems before they are graduated from high school. Furthermore, they must be instructed as to how they are to meet their own health needs. This entails familiarizing them with hospitalization, *i.e.*, what hospitals are available, their location, and their particular functions; with clinics and their particular function in the community; and with the medical profession and its societies. This last is of particular importance. Some communities are taking definite steps along this line through written communications, from the local medical society, the board of education, and the board of health jointly, to parents urging them to take their children to their private physician for a physical examination before the opening of school. Remarkable results have been attained in some schools through such a program. As high as an 80 per cent response has been achieved. Such an attempt as this serves the triple purpose of educating the parent as to the health needs of the child, of familiarizing the child with ways of securing health service, and of acquainting the physician with some of the health problems confronted in schools. As this plan becomes perfected, more time may be devoted by the school physician in individual check-ups and less to wholesale physical examinations.

The physician may also be brought more closely into sympathy with the school program of health and physical education by asking him to specify what of certain health and physical education activities a child may indulge in, rather than issuing a blanket excuse from all phases of the program. A modern curriculum of health and physical education includes opportunity for participation in (1) rest, (2) walking classes, (3) light work in the gymnasium, (4) corrective work, (5) regular gymnasium work, (6) athletics, (7) swimming, and (8) health instruction. Surely if a child is able to come to school at all he can take part in some phase of this program. It is the duty of the school to acquaint the physician in the community with the fact that the physical training and physical culture classes that tortured him have been replaced with a comprehensive program of games, athletics, stunts, swimming, and dancing, as indicated. The time has passed when the private physician merely sends a note to the school in his community which says, "Excuse Mary Jones from gym." It is only through the close coöperation of the agencies just mentioned, namely, the local medical society, the board of health, and the board of education, that such integration between the home,

school, and physician may be achieved.

Boards of health are recognizing more and more the crying need for further health education of the community. It has been a slow process through the era of sanitation of the environment and the era of bacteriology to the individual, just as it has been a slow process for boards of education to recognize that there are individual differences among children and that these must be considered not only from the academic standpoint but also from the standpoint of his social, emotional, and physical health.

Some of the media employed by boards of health in their community health education program include the radio, the press, health contests, exhibits, special campaigns, billboards, parent teacher associations, the schools, local service clubs, etc.

There is a definite integration of the school health program with several of these. The radio is an outstanding example. In Detroit there are weekly broadcasts on pertinent health matters. Many of our schools are equipped with radios. Health instruction classes meeting at the hour when these programs are being broadcast tune in on them. The messages are thus going both into the home and into the school.

One of the projects instituted in health instruction classes in the schools consists of analyzing and evaluating health material found in magazines and newspapers. Material in the latter in particular deals largely with local community health problems. Free discussion of these problems develops a worth while community consciousness.

Nutrition classes and home nursing classes have been organized in many schools under the supervision of the board of health. These classes meet a very definite community need particularly in certain socio-economic centers where there are many large indigent families. The older sister brings many healthful changes into the home that would otherwise not have been made. Nutrition classes have of course been particularly valuable during the depression.

Little need be said about parent-teacher associations. This is a fertile field for integration of school and community health and it has been well used although much more might be done.

There are many other agencies, governmental, voluntary, or business, which are leading the way in health education of the community and are also supplying valuable material for the school health program. It is only necessary to mention a few of them to call to mind their significant contributions: The U. S. Public Health Service, state and city departments of health, Visiting Nurse Associations, juvenile courts, National Red Cross, American Social Hygiene, National Health Council, American Physical Education Association; various foundations such as the Commonwealth Fund, the Kellogg Foundation; and various business organizations including the National Dairy and Food Council, life insurance companies, etc.

Special consideration should be given to the work of the National Safety Council and its local branches since accidents have become of such vital concern to every community. This is an outstanding example of the extent to which integration between school and community may go when each is aroused to the seriousness of a situation. Here we find police departments, the American Legion, chambers of commerce, and local service clubs working in close harmony with school authorities in decreasing the incidence of accidents. All of these agencies are endeavoring to educate the public in accident prevention. The results of their coöperation with the schools in an educational pro-

gram to prevent accidents, particularly vehicular ones, are seen in the steady decrease of child injuries and fatalities. Were we to attain an integration of the school health program and community health education equal to that attained between safety education in the schools and the community safety program we would see a tremendous change in the health of our entire citizenry. It is not beyond attainment and, to recapitulate, the experiences of the last 5 years have brought about changes that have stirred all of us out of our lethargy.

Terminal Disinfections

FIVE full years have now elapsed since routine steam disinfection was discontinued, and the following table shows in summary form the results of the last 5 years compared with those of the 5 years immediately preceding. In the table the results of 5 years (1925–1929), during which steam disinfection had been carried out, can be compared with those of 5 years (1930–1934) during which it had been abandoned. The table shows at a glance the total number and also the percentage of secondary cases occurring in premises from which the original cases had been removed previously. By way of explanation, it should be pointed out that, in the final comparison, secondary cases occurring within a week of the primary case have been excluded, the reason being that such cases occurring within the known incubation stage of the two diseases may have been infected by the primary case before removal to hospital.

Period	*Steam Disinfection*	*Disease*	*Cases Notified*	*Cases Removed*	*Secondary Cases After 7th Day*	*Percentage of Secondary Cases*
		S.F.	2,054	1,315	80	6.03
1925/6/7/8/9	Practised	Diph.	1,538	1,272	59	4.63
		Total	3,592	2,587	139	5.37
		S.F.	2,542	1,683	104	5.51
1930/1/2/3/4	Abandoned	Diph.	1,050	896	33	3.68
		Total	3,592	2,579	137	5.31

It will be seen that, in the case of scarlet fever, the percentage of secondary cases has dropped from 6.08 per cent to 5.51 per cent, whereas the relative figure for diphtheria has fallen from 4.63 per cent to 3.68 per cent during the two periods under review. When comparison is made between the total figures (including both scarlet fever and diphtheria) it will be seen that the percentage of secondary cases has diminished from 5.37 (with steam disinfection) to 5.31 (without steam disinfection).—*Andrew W. Forrest, Leyton—Pub. Health,* Mar., 1935, p. 239.

Preliminary Report of the Sub-Committee on Educational Qualifications of Public Health Engineers*†

SCOPE OF PUBLIC HEALTH ENGINEERING

THE field for engineers in public health work has been restricted largely to state health departments with a few openings in city, county, or district health departments. In general, the technical education of public health engineers thus employed has been in sanitary engineering, or in civil or chemical engineering, with courses in general sanitation. These courses have been confined primarily to the subjects of water and sewage treatment and industrial waste disposal with the necessary chemical and biological instruction.

Formerly, and in some states still, engineers with state health departments dealt principally with problems of water, sewage, and industrial wastes. While still an important work of state health departments, these are now only one branch of engineering activity; as for the engineer of the city or county health department, these may be of minor consideration.

At present a few schools offer courses in the subject but, generally speaking, engineers have found it necessary to obtain a considerable part of their public health education through experience. This condition will probably continue until public health administrators exact an adequate degree of graduate education comparable with the responsibility of positions to be filled.

At present the outlook appears favorable for the development of the well rounded health organization, both state and local, with properly qualified personnel. In such departments there is a rather broad field for the engineer qualified to do public health work.

A study of the activities of a well rounded health department shows that environmental sanitation in its broadest sense constitutes a considerable part of the work of the department. In administering this important but nonmedical work, basic engineering knowledge and some knowledge of a variety of other professional and technical branches would appear essential. To administer properly the various public health engineering activities, and to assist and advise the health officer in matters where both medical and nonmedical knowledge is necessary, requires graduate education.

Briefly, some of the activities now being carried on by engineers connected with health agencies, or activities that by their nature would appear most logically to fall under the administration of one having proper public health engineering education, are as follows:

1. The group of activities having to do with water, water supply and treatment, sewerage and sewage disposal, industrial

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* Committee on Professional Education, American Public Health Association.

† The Committee on Professional Education requested publication of this report to permit the members and Fellows of the American Public Health Association to review it for the purpose of offering criticisms and suggestions to the committee in the further consideration of the reports.

wastes disposal and stream pollution correction will naturally come first. These activities require a knowledge of engineering and such collateral subjects as chemistry, bacteriology, and water biology.

2. The sanitation of rural and recreational areas, including camps, swimming pools and bathing places, schools and public places.

3. The collection and disposal of municipal wastes, while not generally classed as an activity of a health department, always require the attention of health authorities, and it is believed that the problems involved in this activity can best be solved by an engineer having a public health viewpoint.

4. Sanitary control of foods, including the production, pasteurization, and distribution of milk, and the sanitation of the shellfish industry in the coastal states. These varied problems are largely of an engineering nature but also require some knowledge of food technology, chemistry, and biology.

5. Suppression of certain insects capable of transmitting disease occupies a considerable portion of the time of some engineers now with health departments. Rodent control should also be included with insect control activity since both endemic typhus and plague are transmitted through the rat flea. Engineering knowledge and some knowledge of entomology and biology are required in this class of health work.

6. In cities particularly there are many and sundry problems which engage the attention of the engineer of the health department. These include questions of proper city planning, of housing, of heating, lighting and ventilation of buildings, of plumbing, of aerial pollution, and of noise. These problems are largely engineering in character and could best be handled by an engineer with a public health viewpoint.

7. In the epidemiological studies of many diseases, in statistical studies and in the educational program, the engineer should take a considerable part.

8. Obviously the direct supervision of personnel engaged in environmental sanitation should be under the engineer.

Due to the variety of work of an engineer in a health department, it is not reasonable to expect that during an undergraduate course sufficient training can be given to enable him to solve these varied problems. In the future it seems essential that undergraduate instruction be followed, either as it has been in the past, by a period of years devoted to sub-professional and professional work under the supervision of a more experienced engineer, or that provision be made for an additional educational program extending beyond that required for the bachelor degree. It is recognized that most practising public health engineers have acquired this preparation by practical experience. It is also recognized that no educational policy can be formulated that will provide the thorough education that can come through such experience. The public health engineer who has had the opportunity to secure this education by years of experience has a distinct professional advantage over the engineer entering the public health field for the first time. It must be recognized therefore that in the existing field of public health engineering practice there are many engineers who have not had postgraduate education but who are fully qualified through experience to carry on public health engineering activities.

EDUCATIONAL QUALIFICATIONS

The basis of public health engineering education should be engineering.

The duties of the committee are to determine what the minimum of education should be beyond that possessed by a graduate of engineering in order that he may enter a health agency as a public health engineer. Even with this education it is obvious that such a young man would necessarily be in a subordinate position, except possibly in a small unit, until such time as he had acquired the necessary experience to permit him to occupy an administrative position.

In many ways the additional education required beyond that included in the usual engineering course is quite similar to that which would be required for a medical man desiring to enter the field of public health as an administrator. The engineer who adopts

public health as a career should have, in general, educational qualifications somewhat comparable to those of a medical man entering this field. In other words, the public health engineer should be first a graduate engineer, and then should have in addition from 1 to 2 years in graduate work which should include the subjects listed below, since not all of these subjects or their equivalent can be covered in the undergraduate work.

While courses in civil or sanitary engineering or optional courses probably offer the best foundation for public health engineering work, the committee would not confine the basic education in engineering necessarily to these courses. Engineering courses with electives in subjects on sanitation appear satisfactory for basic education, provided courses in sanitary bacteriology, sanitary chemistry, and personal hygiene are included.

It is recommended by the sub-committee that, in addition to the subjects normally required for a bachelor's degree in a curriculum outlined above, graduate work should include instruction in:

1. Biostatistics sufficient to give the individual a sound conception of the mass phenomena of disease, familiarity with methods of collecting, recording, and studying statistics on vital phenomena, and ability to interpret the results of the analysis of such material
2. General or theoretical epidemiology, including instruction in the collection, recording, analysis, and interpretation of epidemiological information regarding those diseases toward the prevention and control of which the public health engineer would be expected to contribute
3. General historical background of health administration and a general knowledge of the organization and functions of the national, state, and local health administrative units
4. Fundamentals of common law
5. Sanitary biology and instruction in interpretation of laboratory reports and methods of administration and operation of laboratories in connection with public health work
6. Food technology, with particular reference to production and pasteurization of milk, and familiarity with methods of protection against such diseases as may be transmitted by foods
7. Entomology as it applies to those insects which may be vectors in disease transmission and in methods of this control
8. Housing with respect to health
9. Lighting, ventilation, and plumbing sufficient to give the individual some knowledge of these subjects
10. Industrial sanitation, particularly with reference to certain hazards the correction of which is largely an engineering problem
11. Environmental sanitation as it applies to rural areas and to recreational facilities

Certain subjects above indicated may also be required for health officers. It is believed that instruction in these subjects should be essentially the same for both groups.

Where sufficient instruction in any of the subjects listed has been obtained during the undergraduate course, such subjects need not be repeated.

It is not advisable to attempt to set up any definite schedule of hours of courses, since experience is necessary to determine the proper allotment of time to such courses. This should be left to the educational institutions.

It is considered essential that the experience offered, in lieu of such formal instruction, and also the instruction leading to a position of administrative responsibility, shall be acquired under the technical supervision of experienced public health engineers.

It is the sense of the committee that the title of an engineer who has completed this formal instruction or who has acquired the equivalent through experience should be "Public Health Engineer."

R. E. TARBETT, *Chairman*
A. P. MILLER
J. L. BARRON
EARNEST BOYCE

Preliminary Report of the Sub-Committee on Educational Qualifications of Sanitarians*†

THE duties of this group of health department employees have a wide range, since the carrying out of the environmental sanitation program in all its complexities is its function. These duties can be performed best by one having a technical background, since the problems are largely of a technical nature.

The sanitarian and the public health nurse are the two classes of employees of the health department who come more closely in contact with the general public than any other class of employees. As a consequence, the public judges the efficiency of the health department largely by the work carried on by these two groups.

It seems essential, therefore, that the sanitarian should have sufficient education, including field experience, to permit him to meet the public and to discuss intelligently the work in which he is engaged.

EDUCATIONAL REQUIREMENTS FOR SANITARIANS

Title I

Sanitarian—The committee recommends that the title for one class of employees be "Sanitarian," with such prefix as the training in a particular branch of public health work would indicate. However, when the term "Sanitarian" is used without prefix it should designate a person who has had certain basic instruction in engineering and who later by additional work, may qualify as a public health engineer.

The committee recommends:

1. That the educational requirements be a bachelor's degree from a recognized institution of learning, followed by at least a 1 year course, or its equivalent, in certain subjects necessary for one entering the public health field. Undergraduate work should include science courses, particularly biology and chemistry.
2. The subjects required should be such as to give a general knowledge of health department activities and include some intensive instruction along one or more lines of health work. The intensive instruction might well be grouped under the 3 headings: general sanitation, sanitary control of foods, and control of the environment.

General instruction is recommended in:

1. Biostatistics
2. A general knowledge of epidemiology, including methods of collecting, recording and interpreting epidemiological information regarding those diseases toward the prevention and control of which the sanitarian would be expected to contribute
3. Health administration sufficient to give a general knowledge of the forms and methods of operation of health departments

Special instruction is recommended in:

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* Committee on Professional Education, American Public Health Association.

† The Committee on Professional Education requested publication of this report to permit the members and Fellows of the American Public Health Association to review it for the purpose of offering criticisms and suggestions to the committee in the further consideration of the reports.

1. General sanitation, including nuisances, water supply, sewage disposal, rural and recreational sanitation, mosquito control, and rodent control; or

2. Sanitary control of milk and foods, including laboratory procedures and methods of protection against such diseases as may be transmitted by foods; or

3. Control of the environment, to include housing, plumbing, lighting, ventilation and industrial sanitation.

It is assumed that the undergraduate course would serve as a guide to the individual in the special line of instruction selected for graduate work. Where sufficient instruction in any of the subjects listed has been obtained during the undergraduate course, such subjects need not be repeated.

Title II

Sanitary Officers—It is realized that the employment of personnel not having the educational qualifications above specified will continue until public health administrators are able to require higher standards in this phase of public health work.

During the interim it is recommended:

1. That non-professional employees be given the title of Sanitary Officer;

2. That the educational requirements be not less than graduation from high school and at least 1 year's experience in some line of work that has brought the individual in contact with the general public; and

3. That steps be taken by the health agency to supplement the employee's education in health work by courses equivalent to a 2 year college course; or

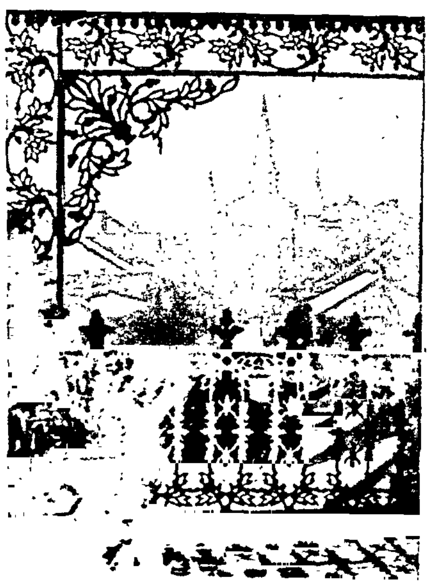
4. The completion of a 2 year course in an institution providing a course of instruction in public health prior to employment;

5. That individuals not having had instruction or experience in health work should not have exceeded 35 years of age at time of first employment.

R. E. TARBETT, *Chairman*
A. P. MILLER
J. L. BARRON
EARNEST BOYCE

THROUGH A FRAME OF GRILL
NEW ORLEANS

The Vieux Carre, or Old Quarter, of New Orleans is rich in architectural antiquities. Through the cast iron and hand-embroidered iron work of antebellum slaves can be seen from this Pontalba balcony many colorful vistas of Old New Orleans. The St. Louis Cathedral, built in 1792–1793, is shown in the background.



EDITORIAL SECTION

THE SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE

THIS *Journal*, representing one of the oldest health organizations in the world, and the oldest in America, offers congratulations to Thomas Parran, M.D., on his appointment as Surgeon General of the U. S. Public Health Service. It also offers to the Service itself and to the country, congratulations on the wise selection of the President for this most important position. We pledge to Dr. Parran our support and aid in carrying out the duties and responsibilities of his new position.

The appointment fulfils an expectation of several years' standing, during which Dr. Parran has held the important position of Health Commissioner of the State of New York, a position affording abundant opportunity to observe him in action and become familiar with his methods.

Dr. Parran enters on his duties about a year after the passage of the Social Security Act and directly after the appropriation was made which put that Act into effect. For the first time in our history the government has appropriated large sums of money for a national health program designed to be continuous, and which, without taking from the individual states their responsibilities and authority, will lodge in Washington a supervisory service carrying with it financial aid as well as professional counsel. The administration of this Act, although outlined in the creative law, will tax to its utmost the Public Health Service. The law requires that the Surgeon General confer with the State and Territorial Health Officers, and he has accepted the report of a committee of that body and incorporated its conclusions into the administrative regulations. Inasmuch as 16 of his 20 years of service have been in state health departments, Dr. Parran will doubtless endeavor to carry out the sound programs of the state health departments.

The personnel of the U. S. Public Health Service constitutes a large and exceptionally well trained body of public health experts, in every recognized phase of the work. The history of the Service and its achievements gives us assurance that within his organization the Surgeon General has at his command the best of advice as well as the best in the practical field.

It is well to recall something of the history of our Public Health Service, created in 1798 with the principal object of protecting maritime trade. It was known for years as the Marine Hospital Service. In 1902 it became The Public Health and Marine Hospital Service, and only in 1912 did it acquire the name which it now carries, the U. S. Public Health Service. In 1901 the Hygienic Laboratory for the investigation of infectious and contagious diseases was authorized, and in 1912 authorization for research was extended to include all diseases of man and conditions influencing the propagation and spread thereof. In 1930 further facilities for research were provided, and the name of the Hygienic Laboratory was changed to National Institute of Health.

The Service has always answered every call made upon it promptly and efficiently. Following the World War, the Service was designated as the principal agency to care for World War veterans in need of hospital care. Tremendous responsibilities were placed upon it at practically a moment's notice, and to its credit let it be said that though it was in contact with some of the most notorious scandals of the early post-war period, it escaped contamination, and investigations showed that it had been conscious of its responsibility, had provided hospitalization for veterans in the emergency, and had protected the government and the public under most trying circumstances.

Our government has never recognized the necessity of a national board of health, headed by an officer in the Cabinet of equal rank with those in charge of labor, agriculture, commerce, and similar major governmental activities. The World War taught both England and Canada the importance of the creation of such departments. In 1879, under the threat of an epidemic of yellow fever, a national board of health was created, but through lack of appropriation, almost as soon as the fear of yellow fever was over, this organization sank into innocuous desuetude, and some years later (1893), the law creating it was repealed. Many of the functions of a national board of health were assigned to the Public Health Service. Step by step these responsibilities have been increased and the field of endeavor has been enlarged; but in spite of what the Service has accomplished and the general recognition of the important place it holds, it is still a bureau of the Treasury, with an Assistant Secretary of the Treasury in direct charge.

In the April, 1936, issue of this *Journal* there was published an article by Dr. Parran, entitled "Health Security." In that article he mentioned several important problems confronting health workers that require attention at the present time. These problems included the completion of our job against tuberculosis, a real campaign against syphilis, the making available to people everywhere of facilities for the proper diagnosis and treatment of cancer, the reduction of death rates of mothers in childbirth, and babies in their first month of life, the correction of conditions resulting from improper diet, and the restoration of crippled children to lives of usefulness. It is evident that Dr. Parran has hitched his wagon to a star—a commendable aim.

It may be properly inferred that Dr. Parran considers these as major objectives of the federal and state governments in connection with the inauguration

of more extensive health work throughout the country under the Social Security Act.

It would appear that Dr. Parran is a happy choice in the selection of a Surgeon General confronted with the work of carrying out the provisions of the Social Security Act with relation to its public health aspects. In this task we wish him success and assure him of support and active assistance so far as lies within our power.

WORK FOR THE EDITOR

"BRING candid Eyes unto the perusal of men's works, and let not Zoilism or Detraction blast well-intended labours. He that endureth no faults in men's writings must only read his own, wherein for the most part all appeareth white. Quotation mistakes, inadvertency, expedition, and human Lapses, may make not only Moles but Warts in learned Authors, who notwithstanding, being judged by the capital matter, admit not of disparagement. . . . Capital Truths are to be narrowly eyed, collateral Lapses and circumstantial deliveries not to be too strictly sifted. And if the substantial subject be well forged out, we need not examine the sparks which irregularly fly from it."

This is the statement of an unusually wise man. Can we accept it? It contains much that is true, but lapses of several authors, such as those quoted by him, have led to much that is incorrect in history and emphasizes the advice of Oliver Wendell Holmes, "not to take authority when I can have facts."

Just at this time, papers are being prepared for the Annual Meeting of our Association and prospective authors are preparing material with which they hope to enlighten the world. There are times when a conscientious editor becomes very pessimistic, especially just after an Annual Meeting, when it becomes necessary to read and judge several hundred papers. One might take the kindly view expressed by Sir Thomas Browne, and even adapt the words of Cowper, "A heavenly mind may be indifferent to her house of clay, and slight the hovel as beneath her care," but we cannot bring ourselves to believe that this would make for good literature or clear understanding.

We do not wish to be pedantic, but certain expressions better avoided often occur. It is true that English is a growing language. Many words have gained new meanings, others which were correct are now incorrect or impolite; and some formerly incorrect now appear in good company. What are we to think of the professor of public health at one of our leading universities who twice in one paper assures us that a large number of children have had "diphtheria inoculations"? The editor often feels that the most unkind thing he could do to some authors would be to publish their papers exactly as they are written.

Writers seem to have a spite against certain words; "suspicious," for example, as "suspicious pneumonia." "Total" is more often used incorrectly than correctly, when the writer refers simply to a certain number—cases or population, for example. The word "period" is much abused. Instead of saying "from Tuesday to Thursday," for example, or "during 48 hours so and so occurred," we find "during a period of time extending from Tuesday to Thursday," or "a period of time of 48 hours duration"—a waste of words, if no worse. Period has several meanings. Fowler says: "A period is an era regarded as destined to run its course and be succeeded by a similar succession." The word "enhance"

seems to be growing in popularity. It sounds learned. Fowler says it is "a dangerous word for the unwary." The word "case" is a nightmare as used. The patient is not the case, the patient dies or recovers; the case terminates fatally or in recovery. The surgeon operates *in* a case but *on* the patient. Such statements as "the case gave the following history" are entirely incorrect. Another word often wrongly used is "such," for example, "when there are epidemics or impending danger of such." We often find such expressions as "The reason lies in the fact that," when it would be more clear and simple to say, "The reason is." We frequently find such statements as "Examinations, all of which were normal," meaning that the materials examined were found to be normal. One of the most common mistakes is to use "affect" for "effect" and *vice versa.* We also find such a statement as, "this disease is very fatal," as though there were degrees of fatality itself. It would be easy to extend the list of words wrongly used; but these will suffice for our present purpose.

At an Annual Meeting, at the request of a chairman of a certain session, some suggestions on the writing of papers were given. All that was said there holds good. We ask writers not to pad their papers for any reason. Historical introductions are sometimes useful and interesting, but generally the shorter the better, and seldom is there any reason for more than a few lines. Padding with quotations should be avoided. A recent contribution had some 7 pages of quotations. It is fair to assume that anyone enough interested to read a scientific paper, either has the material from which these quotations were taken, or can obtain it. Practically all journals have cut down on bibliographies. Unfortunately, in many cases there are grave doubts as to whether or not the many authors referred to have been consulted. The writer has found the same error in almost the same words running through more than 12 successive articles, evidently one quoted from the other, illustrating further the advice of Holmes. The reference was the same, and the error did not exist in the original.

One is tempted to close with an incident. A few years ago a paper was submitted which was almost unintelligible. The author of the paper had been entirely wrong in his judgment of an outbreak and of its source. He had been corrected as to facts but his ideas were still hazy and his English, if possible, was worse. The paper was practically rewritten by the editor. The statistics were corrected and made intelligible by one who understood figures, and a presentable paper was the result, yet an English journal picked this paper out for special comment.

NOTE: There are many good books on the writing of papers. The standard is *Notes on the Composition of Scientific Papers,* by Sir Clifford Albutt. American books are *The Writing of Medical Papers,* by Maud H. Mellish Wilson, and *The Art and Practice of Medical Writing,* by Simmons and Fishbein, now badly in need of revision. Several universities have their own style manuals, one of the best being that of the University of Chicago Press.

FLOODS AND THE MILK SUPPLIES

WHEN floods, tornadoes, and other disasters strike, the newspapers usually devote many fervid columns to sensational and dramatic incidents, but seldom mention the routine services that are equally significant to the protection of life and health. In describing deaths, injuries, and individual acts of heroism,

the press often overlooks the somewhat prosaic activities of the doctors, nurses, and sanitarians who are mobilized to give relief and prevent disease, and they rarely notice such humble servitors as the dairymen and food purveyors whose diligent activities often avert malnutrition and even starvation.

During the recent devastating floods in the United States, local dairymen performed especially noteworthy services. With bridges down, roads impassable, railroads out of commission, and most of their territories under deep water, the dairy companies sent fleets of trucks hundreds of miles to get the milk through. They overcame almost insurmountable difficulties in order to maintain deliveries of pure, pasteurized milk, and in some instances had to employ airplanes to transport necessary pasteurizing machinery for emergency use.

Milkmen, who were often on 24 hour duty, commandeered rowboats, powerboats, canoes, and rafts for their deliveries; they waded waist high through swirling and dangerous currents; they climbed precariously along fences and over narrow planks, so that no child should be deprived of this essential food. Farmers appeared around the bend of what had once been the road, in boats or on horseback, carrying cans of milk that distributors could pasteurize and bottle for prompt delivery under hazardous conditions to private homes, to the marooned and to refugees, to national guardsmen and Red Cross workers, and above all, to the mothers of infants and young children.

The dairymen and the milk companies in the flooded regions made contributions to public health that the local health officers will not soon forget. Their achievements and sacrifices were recognized editorially by a number of leading newspapers, including the *New York Times*, indicating that the public as well as the medical profession is not unappreciative of the labors of its milkmen heroes during this calamity.

To appear in July Journal

The Trained Public Health Engineer in Public Health Departments—*Charles Gilman Hyde*

Vitamin D and Child Health—*Fred O. Tonney*

Detection of Shedders of Streptococci Responsible for Infectious Bovine Mastitis—*W. N. Plastridge and E. O. Anderson*

Diphtheria Immunization—*William Edward Bunney*

PUBLIC HEALTH EDUCATION*

"When the literary apprentice has read the masters of the English tongue he should know 'classic' English when he sees it. This is every man's best foundation style, whether he wishes to write novels, become a journalist, or write letters home to mother.

"There is no great gulf between 'classic' English and newspaper English at its best. The aim of both is effectiveness of assertion. And effectiveness of assertion, says Bernard Shaw, is the Alpha and Omega of style."

In "Learning to Write" in "Writing for the Press," by L. Russell. A. and C. Black, London. (Macmillan Company.)

Ninety-Nine Thousand Deaths—"Accidents of All Types Take 99,000 Lives During 1935" is the title of a press release from National Safety Council, 20 N. Wacker Drive, Chicago, Ill. *Free.*

Among the details is the 1 per cent increase of deaths by motor vehicles, and the occupational accident deaths, less than half those due to vehicles, and less than half what they were 25 years ago!

Five Little Teachers—Again the 5 little Canadian girls have served their sisters throughout the two countries. In the last week of March, N.E.A. Service syndicated "Dr. Dafoe's Own Story of the Quins." The delightfully conversational statements about the mental and physical health of the babies seem to offer much quotable material, but N.E.A. Service has informed us that the writings of Dr. Dafoe may not be reproduced, or quoted.

A New Service and a New Periodical — Adequate provision for public health education is promised through the newly organized Office of Public Health Education, U. S. Public Health Service, Washington, D. C.

An official announcement of the rather heavy undertaking of the new office is quoted from *The Health Officer:*

> The responsibilities of the U. S. Public Health Service are increasing along with the increasing complexity of modern life. Although the dissemination of knowledge is now generally recognized as a supreme duty, not only of educators, but of public health workers, and, indeed of all scientists, no organized and concerted effort has been made by the Service, up to the present time, in the field of health education.
>
> Such an effort has been initiated in the recent establishment of the Office of Public Health Education, under Assistant Surgeon General L. R. Thompson, Chief of the Division of Scientific Research. The purpose of this office is to carry out certain experimental studies in health education.
>
> The initial activities of the Office of Public Health Education embrace 6 major duties. First, the training and instruction of young commissioned officers of the Service; second, special instruction for educators, health officers, and sanitarians from state health departments, and from health departments of

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

foreign countries, and for other eligible individuals. Third, the office will make studies of educational methods employed in various health agencies and in other fields of education, with a view to adapting the methods to our own purposes, and to developing new and improved methods. Fourth, experimental studies in mass adult education, through the use of the radio, will be made for the purpose of evaluating various methods of radio education. Fifth, permanent records of available material will be filed and will be a repository of authoritative information in the field of health education. Sixth, the Office of Public Health Education will prepare a bulletin of current health information, primarily for the personnel of the Service. The first issue of this bulletin is now in the hands of its readers and is titled *The Health Officer: A Digest of Current Health Information.*

Advances in the general sciences and in medical science, especially, leave us wondering how it is possible for the health officer to acquire, hold, and augment his knowledge of the ever expanding fields of public health and preventive medicine. One of the primary functions, then, of this office, will be to issue a monthly digest of current public health information, for commissioned and other officers of the Service, for health officials throughout the country, and for those of the laity who are interested.

The purpose of *The Health Officer* is to report the activities and progress of our fellow officers in the various stations of the Service. Current happenings in any branch of personal, community, or public health, and in other branches of science concerned with the public welfare, will be reported.

Each month, *The Health Officer* will present abstracts of important and pertinent articles from the current literature in community health and sanitation, public health administration, public health methods, preventive medicine, personal hygiene, social sciences related to medicine, and other related fields. Reviews of significant books in these fields will be included.

The Health Officer, as its title and aim indicate, is "of" and "for" the health officer of today. That it may also be "by" him is the hope of the Office of Public Health Education. Any officer possessing information of general interest to the personnel of the Service is invited to write the office about it, in order that the news may be shared through this publication. Officers are further invited to outline their own activities by summarizing the material and submitting it for future issues of *The Health Officer.*

The 23 letter-sheet mimeographed pages of the initial issue include:

an announcement of the new service, a welcome to Dr. Parran, "Commissioned officers' training course now in progress," book reviews, abstracts of articles, and "annotated articles."

Write U. S. Public Health Service if you wish to receive copies.

Now Easier to Handle—Have you noticed the added words and numerals at the tops of pages of the *Journal,* starting with January, 1936, issue?

A helpful device for those who receive an extra copy of the *Journal* so that articles may be clipped and filed by topics or by prospective uses. At least many of the clippings will be dated automatically at the top.

A set of *Journals* plus classified clippings makes the ideal set-up for wider use of the magazine.

An Exhibit May Be Too Lifelike—Models of buildings or displays using human figures, animals, etc., may be too lifelike to be educationally effective. The more nearly perfect such displays are the more likely that visitors will be so absorbed in the perfection of the figures or buildings that they get little of the lesson supposed to be taught. And dolls are equally distracting. Either they are foolishly "doll-like," or they are such "cute" lifelike reproductions.

More effective, and less expensive, are photographs mounted and cut out. Such cut-out photographs used by Pennsylvania Sanatorium for Tuberculosis and by Henry Street Visiting Nurse Service are shown in "Publicity for Social Work," by Routzahn (Russell Sage Foundation). See opposite page 300.

Negro Health Week Any Week—The annual Negro Health Week is past, but Dr. R. C. Brown, Director of

the Week, U. S. Public Health Service, Washington, D. C., calls attention to the fact that in numerous communities for various local reasons, Negro Health Week will be celebrated at a later date.

For copies of the program, a sermon, and a radio talk, write to Dr. Brown.

A program folder is neatly done on one sheet with French fold, printed both sides. The sheet, 19½ x 12½ inches, is folded twice so that the 4 chief pages are seen as 9¾ x 6¼ inch pages. When the whole is unfolded there is the 19½ x 12½ inches for an inspirational display of activities and printed matter gathered from many cities in previous years.

Health Education in Canada—As reported in *Canadian Public Health Journal*, 105 Bond St., Toronto, Ontario. April, 1935. *35 cents.*

Public Health Education Section of Canadian Public Health Assn.: Chairman, Dr. G. F. Amyot, North Vancouver; Vice-Chairman, May Power, Toronto; Secretary, Dr. Stewart Murray, Vancouver.

In the joint health meetings at Vancouver in June, 1936, the newly formed British Columbia Health Assn. will unite in one session with the Public Health Education Section under the chairmanship of Dr. Amyot.

In the May, 1936, annual meeting of Ontario Health Officers' Assn., Dr. D. V. Currey, Medical Officer of Health, St. Catherines, Ontario, presented "The Local Board of Health as Its Own Publicity Agent."

A page is given to a tuberculosis exhibit in Vancouver, B. C.

"Brantford, the 'No Diphtheria Town'" tells of Brantford's annual immunization campaign in which a letter to parents said:

> Dr. Dafoe gave the toxoid treatment to the Dionne quintuplets; your baby is deserving of the same protection.

A brief report is given of the Eighth Annual Conference on Health Education, organized by the Central Council for Health Education, held in London on November 21, 1935.

The Martin Family Broadcasts—Several years ago this department of the *Journal* expressed its appreciation of the Martin family broadcasts put on in Racine, Wis. Dr. W. W. Bauer, then Racine Health Commissioner, and Mrs. Bauer were responsible for this effective pioneering in the use of simple dialogue in broadcasting.

In *Hygeia,* May, 1936, Dr. and Mrs. Bauer, under the heading, "The Martin Family Vacation," explain the idea, and present two of the episodes.

> The dramatized radio health episodes in this series are selected from 115 such programs broadcast by the Health Department of Racine, Wis., in the last 9 months of 1931, by courtesy of the radio station of the *Racine Journal-News,* now the *Journal-Times.* They have been rebroadcast by medical society and medical auxiliary groups locally. They have been edited and brought up to date for this, their first publication. . . .
>
> The simpler programs here published were broadcast originally with casts furnished by dramatic classes from the William Horlick High School and the Woman's Club of Racine. They can be used as brief platform episodes with simple stage settings, as radio broadcasts over a school public address system or as class-room projects for pretended broadcasting. Teachers will readily find ways of using them and of interesting the classes in providing sound effects, settings, and other accessories.
>
> Any medical society, health department, or voluntary health organization organized and administered not for profit is granted permission to produce this material, provided no admission charge is made. Credit should be given to *Hygeia* and to the authors. If the radio episodes are to be used in a program broadcast at regular intervals (weekly, for example), a uniform introductory announcement like the following, modified to suit local conditions, may be used. It is spoken by the station announcer or by the sponsor of the program, not by one of the players in the episode to follow. It is more effective when spoken "above" the music; that is, with the music toned down to a faint background

for the words, then swelling again to full volume when the speaker concludes:

"During the next 15 minutes we bring you the program of the .... This program, which comes to you each .... at ...., is broadcast under the auspices of the .... which believes that the health of the people is the greatest asset of the community and that health is based primarily on knowledge and understanding of the principles that govern it. Watch for this broadcast regularly at the same hour each ...."

When the episodes are used as platform sketches a dark stage with a radio instrument on which a spot of light is trained, leaving all else invisible, is effective. Under such conditions the same announcements may be used as for radio presentation, but of course the sketches must be memorized, while for the radio they are read from script.

The episodes may also be presented as sketches on a set stage; the setting in each case is suggested by the announcement preceding each script but should not be elaborate in any event. In such a case the announcements would be modified or omitted, especially if a printed or mimeographed program were distributed.

The episodes are best presented in series. They may be used to fill a large gap or just a "spot" in the radio or platform program, as the case may be.

Plan of the Individual Broadcasts—Sequence: Chimes or fanfare. Introductory musical theme begins forte, fading after about 1 minute. Introductory announcement "above" pianissimo musical background: Station Announcer. Musical theme finishes forte. Day's announcement: Station Announcer. Dialogue (10 to 12 minutes). Closing announcement: Station Announcer. Closing music, same as opening theme. Chimes or fanfare.

A phonograph record is suitable for the musical theme. Under present radio commission rulings, a phonograph record used only as an introductory theme incidental to other material need not be announced as a record. The selection should be a lively one, such as "The Parade of the Wooden Soldiers," or a march, like "El Capitan," or "Officer of the Day," but it should not be jazz.

The May issue of *Hygeia* reproduces "What Kind of Vacation?" and "The Doctor Suggests."

If you are at all interested in popular health broadcasts we hope that you will read these two episodes. Further installments will appear in *Hygeia.*

Home-Made Silhouette Making—For exhibits and for printed matter, silhouettes offer effective illustrations. The *New York World-Telegram* (March 21, 1936) tells how to make them—

With a bed sheet, a bridge lamp and a floodlight bulb the amateur photographer can amuse himself by making silhouettes while he waits to take his camera outdoors.

In this simple sideline to indoor photography, anyone can give free play to ability in composing a picture, with the problem of lighting reduced to the A B C's. A little imagination and experiment in posing will be rewarded with silhouettes that are dainty and graceful, amusing or startling in their portrayal of personality.

To make camera silhouettes, hang up a large sheet smoothly so it comes to the floor. A wide doorway is a good spot. Five feet behind the sheet place a bridge lamp with a 750-watt photoflood bulb and a silvered reflector. See that the lamp illuminates the sheet evenly.

Pose the person or group to be silhouetted 2 feet in front of the sheet.

Use fast film for indoor photography. Set the camera, on a tripod or table, far enough from the subject so that it is all visible in the finder. Arrange it for a time exposure, with the diaphragm at stop 8 on cameras using the "F" system, or at stop 1 on cameras with stops numbered one to four.

When the picture has been posed have the subjects remain motionless and turn on the flood lamp and expose for two seconds.

A good way to time a two-second exposure is to open the shutter, say aloud, "A thousand and one, a thousand and two," and close the shutter.

Try To See It as He Will See It—If you issue a small sized mimeographed report, and if you wish to use some tricky folding, ask for a copy of the 1935 report of the Meriden, Conn., Public Health and Visiting Nurse Association. And if you make use of the "Do You Know" form of stating certain facts about your agency note the possible gain in making the heading read "Do You Know That";

and if you have a folded step back front, and if you have a last line making an important point, note how you could make this line and the preceding one into a complete statement, provided that the last line is centered and set in the same type style as the one visible above it. In other words, scrutinize your dummy for additional touches, whatever form of report you may issue. Try hard to see it as it will look to the man who receives a copy of the completed report.

Mailing Lists Are Exasperating—The only answer is personal supervision. And that means a personal examination, say once a year.

Recently experiences of several people have emphasized mailing list possibilities under usual office routine.

When a mailing list is important, or sections of it have much value to your organization it can't be left wholly to routine handling. Whatever the system for handling addresses, it seems worth while for a responsible executive to give it a personal check-up every year or two. Not many health agency lists are so extensive, and their importance so limited, that this could not be done.

"Eye Openers"—Under this title Dr. E. Krimsky answers questions which

> Every doctor will recognize as questions which have been presented to him by patients in the course of his medical experience.

Here are some of the questions:

> Is there danger of eye glasses breaking and causing injury to the eyes?
>
> Will I always have to wear glasses?
>
> Are tobacco and alcohol injurious to the sight?
>
> Are circles under the eyes a sign of eye trouble?

In *Sight-Saving Review*, National Society for the Prevention of Blindness, 50 W. 50th St., New York, N. Y. March, 1936. *50 cents.*

In the same issue: "Eye Health Primer for Nurses"; "A Sight Conservation Program in School" (Dallas, Tex.); "Eyes Right" (reprinted from *Good Housekeeping*. Feb., 1936).

An Adaptable Idea—*Hoosier Health Herald,* Indiana Tuberculosis Assn., Indianapolis, says:

> The National Tuberculosis Association has compiled a scrapbook in which are mounted all the reprints in the field of school health education distributed in recent years. A person visiting that office may see this splendid portfolio which contains reprinted articles on "Healthful School Living," "Health Service," and "Health Instruction." Until articles of this nature are brought together and mounted, one hardly realizes what a wealth of material is available.
>
> Local tuberculosis associations may profit by this suggestion and arrange in a scrapbook or portfolio material which they make available to school teachers. Thus teachers may look over the material which is available and more wisely select those things which meet their needs. A scrapbook is especially good, for it may easily be taken out of the office to teachers' institutes or teachers' meetings where it will prove very useful. A loose leaf folder makes it easy to remove out-of-print material and to add new things from time to time.

An even simpler and less expensive form of portfolio has been used for several years by the Social Work Publicity Council. Kraft (brown wrapping) paper, cut to 14 x 11 inches, 3 holes punched at the left is used. A cover sheet, 14 x 22 inches, is folded once, carries a pasted label, black letters on a gay bit of paper. The number of sheets varies with the subject. It is easy to divide the subject matter for convenient use. Short pieces of cord, about the color of the paper, are tied through the 3 sets of holes in sheets and covers, the knots being placed *inside the back cover.* Many readers have seen these portfolios at Annual Meetings of the A.P.H.A. or the National Conference of Social Work.

The N.O.P.H.N. has a series of portfolios using a more attractive paper cut to 18 x 12 inches.

Make up collections of your own printed and duplicated material. Gather groups of samples from other sources. Whatever subject interests people who come to you for information and advice may be represented by a portfolio, even if the material is limited.

You will be surprised at the interest shown by your visitors, who won't need nearly so much of your time when you can hand them a portfolio to look over.

Lower-Case Heads Win—Probably certain lavish uses of capital letters have misled many who wanted to get attention. We want people to look at what we print. We want people to think what we print is important. So we use plenty of capital letters—and make them as big as we can.

But in the 6th annual Exhibition of Newspaper Typography, sponsored by N. W. Ayer and Son, 8 of the 9 newspapers given awards used lower case headlines, with but limited use of capitals. The 9 were selected from 1,444 newspaper entries. The *New York Herald-Tribune* won over the *New York Times,* the latter being the only one of the 9 making use of all cap heads.

The moral? If newspapers don't need a mass of caps to get attention and to help make sales?

And in Annual Reports Also—"Find it if you can" seems to be the theory which guides health education discussion in health department annual reports.

In this section of the *Journal,* April, 1936, page 424, we called attention to the simple device employed to bring out the health education material in all divisions of the Pittsburgh Health Appraisal report. The absence of that sub-heading, "Community Health Instruction" under any main heading, emphasized the lack of health education activities. This use of the sub-heading also made easily available whatever was said on the subject.

Important health education, likely to be carried on in communicable disease, child welfare, or other bureaus, may not be reported because the chiefs are more interested in other aspects of their activities. An understanding that a public health or adult health education heading should be used if possible, would keep the matter before the chiefs of divisions or bureaus.

The use of data or explanation of a division or bureau might be recorded under this heading. Vital statistics might report the use of data in health education by some other division of the department. Laboratory might report that its services to the public had been reported by the department in broadcasts, a series of news releases, or a newly issued folder. And so with others.

Cancer Education Via Radio—Says *Bulletin,* American Society for the Control of Cancer, 1250 6th Ave., New York, N. Y. (April, 1936):

In the process of developing various methods of reaching the lay public in the campaign of cancer education the radio has begun to assume a position of outstanding importance.

Among the pioneers in the field has been Dr. W. A. O'Brien of the University of Minnesota. For a number of years he has given a weekly health talk over the radio. In this series of talks he has frequently utilized some phase of the cancer problem. This has been accomplished in one of two ways. Either some topic in the field of cancer research, treatment or education has been dealt with directly or information on cancer has been cleverly introduced as a contrast to some other subject under discussion.

The Massachusetts State Department of

Health has also sponsored a series of talks dealing directly with various phases of the cancer problem. The interest in both of these ventures has been sustained and encouraging.

More recently the Cancer Committee of the Louisiana State Medical Society under the chairmanship of Dr. Lanford has conducted a large number of broadcasts. Other states are rapidly following suit. The American Society for the Control of Cancer has built up a series of radio talks on cancer contributed by its directors and by the chairmen of its state and other local branches. These talks are in ever increasing demand from all parts of the country. . . .

Perhaps of even greater significance is the highly successful dramatization of playlets dealing with cancer education. There have been two outstanding pioneers in this respect: the American Medical Association and the New York State Department of Public Health. The former conducts a public health program weekly and has dramatized successfully some aspects of the cancer problem. This program has been broadcast by the National Broadcasting Company from which organization permission to use the material must be obtained.

The New York State Department of Public Health has given a series of playlets known as the Health Hunter Series . . . The acting and voices are excellent. A sound record has been made so that the program can be given throughout the state. The records are in great demand . . .

Each such step in public education buries deeper the rapidly disappearing specter of cancer phobia and serves as a guarantee that the efforts to encourage a more enlightened public attitude toward cancer control are bearing fruit. Knowledge of the success which has attended these pioneer advances should spur others to the utilization of the motion picture, the press, magazines, and the stage as vehicles for expression. The period of free speech on cancer control has only just begun. We may expect the future to provide progress not only in the amount of publicity but in the ingenuity in the forms used to carry the educational message.

Farewell to American Child Health Association—The Sept.-Nov., 1935, issue of *Child Health Bulletin* appeared in April, 1936. Published for a number of years by American Child Health Association, this final issue was devoted largely to "The Story of the American Child Health Association," by Dr. Philip Van Ingen.

It is a heartening record. It will be a revelation to many to read in brief compass the record of the several groups and the combined organization, from June, 1908, through to August 13, 1935. Probably copies of this issue have been received by numerous health and education bodies, and by public libraries.

This issue includes 7 pages of annotated "Child Health Literature," which has been so ably presented for years by Ellen C. Babbitt. Will not some health or education periodical continue this splendid service?

Health Education, Journal, March, 1936—Of interest in *American Journal of Public Health:*

"Laws, Dealer's Insurance" (page 228), editorial from *Daily Record,* is good for use with local milk producers and distributors.

In "Books and Reports" see "Free Medical Care, Socialized Medicine" (page 302), and "Mother and Baby Care in Pictures" (page 305).

On page 310 are listed new members of Public Health Education Section.

Wanted back numbers of the *Journal* are noted on page 286.

An important suggestion appears on page xix. The paragraphs preceding the "form of bequest" illustrates one way of presenting the idea of "gifts and bequests." Too often the "form" is given without any explanation. Any health agency may present its claims in a dignified and effective manner when offering a "form of bequest."

References to health education and to the Public Health Education Section are to be found in the supplement, *American Public Health Association Year Book.*

Be sure to read "The Foreword" (page vii).

The Health Conservation Contest

winners are listed year by year (pages 31–33).

The Committee on American Museum of Hygiene "reports progress" (pages 36–37).

"Food Fallacies and Nutritional Quackery" (pages 58–63), report of the Committee on Nutritional Problems, is likely to be particularly helpful as background material and for direct quotation.

"Methods in Health Education" pages 207–208), is a progress report of a Section committee, Ira V. Hiscock, *Chairman. All concerned are urged to give this report careful consideration, and to submit comment, suggestions, and further questions to any member of the committee.*

In "Public Health Aspects of Noise Abatement" (page 225), report of the Committee on Noise, is a plea for education of the public—

in the needlessness of most noise, its ill effects, and the possibility of its abatement.

Health Education in April, 1936, Journal—Items of interest in the *American Journal of Public Health*, April, 1936:

In "District Health Administration in Large Cities," by Rice and Barnard, see organization charts (page 324), and paragraph on health education (page 326).

"Authoritative Standards and Association Policy," by Frost (pages 336–343), discusses problems which concern the Public Health Education Section and its future.

The group of articles on spray residue on fruits and vegetables (pages 369–389), including references to publicity, may be useful as consumers' groups are aroused by statements of danger from poison on fruits or vegetables.

"Dr. Arthur J. Cramp" (page 381) records the retirement of the long-time chief of what was once the Propaganda and Reform Bureau of the A.M.A., whose record should be known to all who seek to inform the public of commercial dangers to health.

In "Practical Application of An Industrial Health Appraisal Form," by Bristol (page 391), are scoring values suggested for "General Health Publicity" and several health education items under other general headings. See also paragraph on page 394.

"Books and Reports" (pages 432–438) is the annual "review of selected books of interest to public health workers."

Under "A Selected Public Health Bibliography With Annotations" see "Foods That Fight" (page 445), and "Education and Appendicitis" (page 446).

"The Health Conservation Contests" (page 447) is a brief review.

Eight new members of Public Health Education Section are announced (page 449).

Hygeia, May, 1936—Published at 535 N. Dearborn St., Chicago, Ill., the May, 1936, issue of *Hygeia* includes:

Child health . . . Florence Nightingale ("where is her modern counterpart?") . . . Food for two (mother and unborn child) . . . Myths about cancer . . . Helping the child to conquer fear . . . The Jack and Jill house (how the house may be made fit for children) . . . Frauds that flourish until Uncle Sam takes a hand . . . What parents should know about tuberculosis . . . Can you prove that you are a citizen? . . . The case of the pig and the party (a medical mystery) . . . The streptococci (germs we live with) . . . How disease came with the white man (malaria and yellow fever) . . . William Osler (a leader among clinicians) . . . The Martin family vacation (a radio series) . . . The skin in health and disease . . . Babies in bed . . . "Safety First" for children illustrated . . . Health news pictures . . . Questions and answers . . . New books on health.

Under "School and Health" conducted by J. Mace Andress:

Do you know what you may reasonably

expect of your pupils? . . . An experimental program in rural school health education, presented in "Getting results through united effort," "Teacher assistants in health education," and "Building a health education curriculum." . . . New health books for teachers and pupils.

The P.H.E. Section in the Year Book—In the A.P.H.A. Year Book, issued March, 1936, the Public Health Education Section is represented as follows:

Elective Councilors: Philip S. Platt, Donald B. Armstrong, William P. Shepard, John Sundwall.
Associate Editor of the *Journal*: Evart G. Routzahn.
Committee on Meetings and Publications: Homer N. Calver.
Sub-Committee on Scientific Exhibits: Calver, Routzahn, Bertrand Brown, H. E. Kleinschmidt.
Committee on Fellowship and Membership: Shepard.
Committee on Research and Standards: Clair E. Turner.
Committee on Professional Education: Sundwall, and Shepard (Consultant).
Sub-Committee on the Educational Qualifications of Health Educators: Sundwall.
Nominating Committee: Mary P. Connolly.
Sedgwick Memorial Medal Committee: Armstrong.
Committee on American Museum of Hygiene: Victor G. Heiser, Brown, Sally Lucus Jean, Routzahn.
Affiliated State Public Health Societies:
Connecticut: Ira V. Hiscock, Secretary-Treasurer.
Michigan: Marjorie Delavan, Secretary-Treasurer.
Pennsylvania: J. Clarence Funk, Executive Secretary.
Texas: Lewis Bracy, Secretary-Treasurer.

The Section officers and Section Council are listed on page 12.

Public Health Nursing Samples Wanted—For several years the National Organization for Public Health Nursing, 50 W. 50th St., New York, has been circulating a group of portfolios of samples.

Beautifully prepared, these portfolios have made available selected material classified as printed matter, exhibits, general publicity information, movies, plays and pageants, radio. For revising this collection the N.O.P.H.N. requests samples of

booklets, blotters, bookmarks, newspaper articles, visiting cards, copies of radio talks and playlets, photographs of exhibits, etc.

The portfolio idea is commended to nationals and to state health agencies. In the office, at conventions, and in circulation from city to city such portfolios render a valuable service which cannot be duplicated by any other method.

FOR EDUCATION AND REFERENCE

"Anthraco-Silicosis Among Hard Coal Miners," by U. S. Public Health Service. Supt. of Documents, Washington, D. C. *25 cents.*

"Death Rate for Children Decreases," by J. F. Rogers, M.D. 2 page reprint. Office of Education, Washington, D. C. *Free.*

"Dental Health Week in Delaware," by M. H. Harrington, *Journal*, Dental Hygienists' Assn., 159 Brightwood Ave., Stratford, Conn. Jan., 1936. *25 cents.* Details of radio programs; plays and verses by children.

"The Hard of Hearing," by G. Berry. Revised reprint. American Medical Assn., 535 N. Dearborn St., Chicago, Ill. 4 *Hygeia* pages. *5 cents.*

Irradiated Evaporated Milk Institute, 203 N. Wabash Ave., Chicago, Ill., offers free publications on evaporated milk and its use.

"Pneumonia." Four page folder. New York State Dept. of Health, Albany, N. Y.

"Safety Education Research Survey of the Boston Public Schools." Mimeographed outline of WPA Project 7369. Address John P. Sullivan, Supervisor of Health Education, Boston Public

Schools, 15 Beacon St., Boston, Mass.

"Training of Elementary Teachers for School Health Work," by J. F. Rogers, M.D., Office of Education. Supt. of Documents, Washington, D. C. *5 cents.* 27 pages. A review of what is being done—and not done.

Two reprints on the need for state legislation to require proper labeling of lye and other caustics will be supplied by B. R. Rickards, State Dept. of Health, Albany, N. Y. A section committee of A.M.A. on lye legislation has published its thanks to Mr. Rickards for his effective aid in securing such legislation in New York.

MAGAZINE ARTICLES

"Eyes Right," by Dr. J. H. Kenyon. *Good Housekeeping,* 8th Ave. and 57th St., New York, N. Y. Feb., 1936. *25 cents.* Care of baby eyes.

"Machines Which Imitate Life," by G. W. Gray. *Harpers,* 49 E. 33d St., New York, N. Y. Feb., 1936. *40 cents.* Says the *Journal* (page 307, March, 1936) of this article:

> Is an excellent example of the possibility of putting into plain English a subject as obtruse as biophysics or physical chemistry.

"Safe at School!" by H. Barnsantee. *Rotarian,* 35 E. Wacker Drive, Chicago, Ill. May, 1936. *20 cents.* Teaching important car driving facts in school.

"Prostitution in the Soviet Union," by A. W. Field; "Prostitution in New York City" (editorial contrasting the situation in New York and other cities). *Nation,* 20 Vesey St., New York, N. Y. March 25, 1936. *15 cents.*

"Public Health Nursing," by D. Deming. *Junior League Magazine,* 305 Park Ave., New York, N. Y. May, 1936. *30 cents.* What a public health nurse is, and how volunteers may help.

"Society's Ounce of Prevention," by H. H. Martin. *Junior League Magazine.* May, 1936. Abortion and maternal deaths as reasons for birth control.

"When to Immunize and Why," by Dr. W. W. Bauer. Various diseases of children. *National Parent-Teacher Magazine,* 1201 16th St., N.W., Washington, D. C. May, 1936. *15 cents.*

"You Can't Laugh It Off," by J. Lane. *Collier's,* 250 Park Ave., New York, N. Y. March 21, 1936. What *can* be done about too much fat.

BOOKS AND REPORTS

The Work of the Sanitary Engineer—*By Arthur J. Martin. London: MacDonald and Evans,* 1935. 488 pp., 81 ill. Price, 16 s. net.

"An ample supply of good water, the prompt removal and hygienic disposal of all foul matter—these are the indispensable foundations of healthy life." Ways and means of obtaining these necessities are dealt with by the author under 6 main headings: Part I, Sanitary Administration, 57 pp.; Part II, Water Supply, 130 pp.; Part III, Drainage and Sewerage, 65 pp.; Part IV, Sewage Disposal, 130 pp.; Part V, Collection and Disposal of Refuse, 35 pp.; Part VI, Flood Prevention, Land Drainage and Coast Protection, 25 pp.

This comprehensive handbook covers a broad field in a workman-like manner. The 46 tables of hydraulic and cost data will be found especially convenient in supplementing the more descriptive matter. Historical background is adequately covered and administrative and legal aspects are given deserved weight. To the American sanitary engineer, the book is valuable in giving an excellent general knowledge of English practice. To the sanitary administrator, especially of England, the book is ideally suited. So much of the subject matter is fundamental and is so authoritatively treated that the volume will be of great value to sanitarians of all countries.

Mr. Martin, as a lecturer to students in sanitary science, as an instructor of Army sanitary personnel, and as an examiner of candidates for the Institution of Sanitary Engineers, is well qualified to discuss the sanitary engineer of England. Due to the broad field covered, the discussions of individual subjects are of necessity brief, but the book covers in one volume the essentials of what the sanitary engineer in England and elsewhere should know.

A. M. Buswell
M. LeBosquet, Jr.

Elementary Bacteriology — *By Joseph E. Greaves, M.S., Ph.D. (3rd ed.) Logan, Utah: Utah Agricultural College,* 1936. 562 pp. Price, $3.50.

For this 3rd edition many portions of the original have been rewritten or revised, and several new chapters added. The historical portion is presented in an attractive manner. The main body of the work sets forth the chief characteristics of bacteria, their growth and action. Soil bacteria and their significance are given more prominence than in most textbooks on bacteriology. The description of the relation of these bacteria to food production, industry, and the arts is most interesting. The pathogenic bacteria are described as related to the diseases they cause, also as to means of identification and the general measures to be adopted to destroy or control them.

Improvements might be made by giving definite references, as on pages 233 and 388, for the many quotations inserted, or, as on page 100, by giving a bibliography for each section. It would be well, to be more specific in naming places, such as Charleston, page 488. The reader might suspect it was Charleston, South Carolina, but he might also think of West Virginia.

The author does not indicate the source of the figures presented on pages 477–478. If they are U. S. Census Bureau figures, it would be well

to say so. The author makes a loose use of terms when on page 496, he speaks of "death rates." What he has in mind is fatality rates, though he has given not rates but totals, and his estimate that 10 per cent of all typhoid cases die, is higher than now obtains except in rare outbreaks. As the author says (page 472), "inspection alone cannot be depended upon" to detect bovine tuberculosis. This statement should be taken as a corrective to the picture presented of a tuberculous cow, as most infected animals show no such visible signs as the one pictured. These are minor defects, and do not materially detract from a very interesting book, which is well printed and easily read. A typographical error was noted on page 214, line 32 from the top.

JAMES WALLACE

American Chamber of Horrors—*By Ruth deForest Lamb. New York: Farrar & Rinehart,* 1936. 418 pp. Price, $2.50.

The Food and Drug Administration, the author, and the publisher, by preparing this enlightening text, have performed an important service for the American public. They incidentally illustrate also why food and drug legislation encounters so many obstacles: it tries to cover too much ground.

It seems to the reviewer that food and drug control interests often err in attempting to invoke the cause of public health to justify entirely appropriate activities for the prevention of fraud. Most of the Copeland Bill, for which this book is obviously propaganda, has to do with fraud.

The public health side of this exposé is generally known to public health people, although it is claimed that the inside story of the fight to protect consumers against spray residues is told here for the first time. This book is a dramatic, even startling, presentation of the problem of food and drug control and the serious dangers of many products available to the public. It is accordingly a useful contribution to health education.

The American Medical Association is quoted in regard to two dubious products, but there is no comment on its long and valiant fight in this field. Haven Emerson is quoted as President of the "Public Health Association," and indexed under "Public Health Service."

After reading this book one wonders what might be the fate of a bill designed solely from the standpoint of public health protection and which left to other policing agencies public protection against commercial fraud.

Government represents not only consumers but also producers, manufacturers, and distributors. It is thus handicapped in legislating beyond a certain point wholly and entirely in the interest of consumers, or in protecting buyers against the wiles of sellers who, be it said, are voters also. Organized consumer action is more likely to accomplish this as well as the repeal of such legislation as that which makes it harder to buy clean oleomargarine than dirty butter.

Meanwhile the Chief Educational Officer of the United States Food and Drug Administration has written a thoroughly useful book with informative appendices to add to the growing modern library of political campaign literature.

HOMER N. CALVER

The Algae and Their Life Relations—*By Josephine E. Tilden. Minneapolis: University of Minnesota Press.* 550 pp. Price, $5.00.

This volume by the author of *Myxophyceae of North America and Adjacent Parts* carefully carries the sub-title "Fundamentals of Phycology." Recognizing that reference works dealing with special phases of the

field of phycology are available to the experienced investigator, Miss Tilden has set herself the task of preparing a textbook which includes in a single volume all classes of algae in orderly fashion and answers such broad questions as:

> Are there connecting links between the several classes of algae?
>
> Is there a relationship between the several classes of algae and the higher plants, or between the algae and the primitive or the higher animals?
>
> What is the probable place of origin or point of unusual development of any particular algal group with respect to the geological history of the world?

The book opens with 3 thought provoking chapters (47 pp.) on the history of the evolution of the algae, the distribution of the marine algae in time and space, and the classification of the algae in the light of their evolutionary development. These serve as an introduction to the 5 central chapters of the book which deal with the life histories, morphology and taxonomy of the 5 classes of algae: blue-green (52 pp.), red (106 pp.), brown (120 pp.), yellow-green (16 pp.), and green (120 pp.). The marine organisms receive the largest share of the space. Where the organisms under discussion are of some economic (particularly nutritional) value, the author does not hesitate to elaborate on this aspect of phycology. Three closing chapters consider briefly the problem of algal control and the algae as food for animals and for man (22 pp.). An appendix on how to draw algae for publication, a bibliography, and an index complete the volume.

To the public health engineer who is interested in the relation of the algae to public water supplies, Tilden's book will serve as a useful aid in the identification of genera and species. The excellent discussion of the life cycle of the algae should be of assistance in gaining an understanding of their method of propagation especially in relation to their control. A very direct interest should be the record of poisoning of livestock compelled to drink water-bloom algae. This is given in Chapter IX.

The nutritionist will find much of interest in Miss Tilden's discussion of algae as food for man (Chapter XI) and in her comments upon the manifold possibilities in the utilization of marine algae (Chapters V and VI).

The book is well written and contains excellent illustrations. The printing and binding are good.

GORDON M. FAIR

A Guide to Human Parasitology for Medical Practitioners—*By D. B. Blacklock and T. Southwell (2d ed.). Baltimore: Wood, 1935.* 259 pp. 122 figs. Price, $4.00.

On the basis of its purpose as stated in the title, this is a very useful and satisfactory publication. It has the limitations of any book in which a writer undertakes to condense into 259 pages the large subject of human parasitology. The authors warn the reader that many of the statements are true only of the limited number of parasites with which they deal, are not true of all human parasites in the groups discussed, and are even less often true of the groups as they occur in animals. It might be of value to add to future editions a list of the many parasites not covered.

The writers devote 8 pages to a discussion of the microscope and its use. The reviewer is under the impression that a knowledge of the use of the microscope could be safely predicated for American physicians graduating within the past 20 or 30 years, and hopes that this is not an unwarranted optimism.

The arrangement of the book might be modified to advantage. Thus, Chapter XIII, Examination of Ma-

terial, is placed between a chapter on cestodes and succeeding chapters on cestodes and on other worm parasites; apparently it should precede all other chapters on worm parasites.

There are some grammatical errors, such as *feces* as the subject of a singular verb (p. 24); the frequent displacement of the word *only*, this wording tending to occur too early in an expression, as it customarily does in casual speech (p. 30, *et al.*); errata in cross-references, as in the reference to Fig. 46 on p. 41, which should be to Fig. 47, and the reference on p. 50 to p. 25, which should be to p. 24; the statement that a disease is very fatal, since fatal diseases are not more or less or very fatal (p. 70); certain discrepancies between text figures and descriptions (pp. 75, 76, 77); the statement that the alimentary canal of trematodes consists of a small mouth (p. 139); the habitual use of the terms egg and ovum as different things, contrary to customary usage, without definition of the terms as used (p. 159, *et al.*).

The authors (p, 102, *et al.*) accept the existence of pressure as an explanation for the development of alveolar hydatid, which seems too simple, and the matter is still an open question. The keys are highly variable in form and should be made uniform. In some cases, as on p. 110, species keyed to a number (3) should actually appear as a name (*Hymenolepis nana*) at the point where the number occurs.

The text should be brought up to date in some respects: thus, snail hosts of *Heterophyes heterophyes* (p. 148) have been reported by two workers. The life history of *Strongyloides stercoralis*, as given (p. 168, *et seq.*), indicates an unqualified acceptance of Faust's findings. Without prejudice to Faust, the reviewer believes that his findings require confirmation. The statement (p. 176) that in trichinosis cases the patient dies except in mild infections, needs modification. Patients may either survive or die from severe infections. The statement that *Trichinella spiralis* is rare in man (p. 227) needs modification since from 6 to 27 per cent of cadavers examined in the United States have shown infection. The statement that hydatid is more rarely present in sheep and swine than in cattle and horse (p. 233) runs counter to the fact that in pastoral countries sheep are the customary intermediate hosts of the hydatid tapeworm, and that in the United States swine are the customary intermediate hosts.

Despite the criticisms, the book is a useful publication, covering in a small space a lot of information. Its flaws are of a customary sort and some of its weaknesses are those inherent in any effort at extreme condensation.

M. C. HALL

The True Physician—*By Wingate M. Johnson, M.D. New York: Macmillan,* 1936. 157 pp. Price, $1.75.

This charming and useful book is the outcome of fatherly advice given to the graduating class of Duke Medical School. The talk was so well received that the author has expanded it to make the present volume, which is delightfully written and contains a wealth of worldly as well as spiritual wisdom.

It is hard to select one chapter for praise over others, but the reviewer wishes to commend Chapter XII, in which is given a list of books which the author has found of greatest value to himself, and which he advises medical men generally to read. We are somewhat surprised as well as sorry not to see the *Medical Essays of Oliver Wendell Holmes* included.

The book is well printed and can be unreservedly commended to those just entering the profession as well as to the older members. MAZŸCK P. RAVENEL

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Life Expectancy in England—Increases in the British life table during the past three decades will prove an interesting check on our own. At birth, the expectancy for males has increased during these 30 years, 50, 51, 58 years, and for females 55, 59, 62 (decimals omitted).

ANON. English Life Table No. 10. Pub. Health. 49, 7:242 (Apr.), 1936.

Smallpox Study—Among a representative population sample of 8,700 families only about one-fifth of the children had been vaccinated before school (65 per cent of the adults had been vaccinated). Of the 17 cases of smallpox observed, 16 occurred in unvaccinated persons, one had been vaccinated 40 years previously.

COLLINS, S. D. History and Frequency of Smallpox Vaccinations and Cases in 9,000 Families. Pub. Health Rep. 51, 16:443 (Apr. 17), 1936.

Chronic Disease—Among the benefits to be anticipated from the house-to-house survey conducted in 95 communities, covering a population of 3 million is a true picture of the chronic disease situation. Only when the problem is realized will there be an impetus toward a unified effort for its correction.

CUMMING, H. S. Chronic Disease as a Public Health Problem. Milbank Quarterly. 14, 2:125 (Apr.), 1936.

Preventing Heart Disease Deaths—There is a real as well as an apparent increase in coronary disease, says this student of public health, and to prevent further inroads an educational campaign is needed to teach daily exercise as one of the essential health habits.

DENNY, F. P. The Increase in Coronary Disease and Its Cause. New Eng. J. Med. 214, 16:769 (Apr. 16), 1936.

Our Insanitary Cities—About half the major cities of New England and Middle Atlantic states make some pretense at treating sewage, the rest are content to pollute streams and nearby tide water. All the important rivers of the section are polluted in different degrees. What a record!

ELLSWORTH, S. M. Sanitation in the North Atlantic States. Municipal Sanitation. 7, 4:132 (Apr.), 1936.

For All to Read—Truly this man has "the gift of tongues"! One of the best examples of the way to present a health administrative concept. It should be pondered over by every health worker. It happens to be about public health nursing, but there is meat in it for everyone.

HAGGARD, H. W. Who Owns Health? Pub. Health Nurs. 28, 4:214 (Apr.), 1936.

Matches and Gunpowder—If and when migration from Mexico and elsewhere is resumed, then look out for trouble, for there may be plenty when the virus of malignant smallpox is reimported into a population as innocent of vaccination as is ours. The prompt publication of smallpox deaths is essential to public safety. This is an important contribution to epidemiologic literature.

HEDRICH, A. W. Changes in the Incidence and Fatality of Smallpox in Recent Decades. Pub. Health Rep. 51, 14:363 (Apr. 3), 1936.

Another Bugbear Ready for Interment—In round numbers, the upstate New York births per 1,000 foreign born mothers (standardized

rates) have declined one-half, to a rate of 115, whereas the births among native mothers have declined only one-quarter, to 107 (all between the years 1920 and 1934). That so small a difference in birth rates would ever exist between native and foreign born mothers would have been considered ridiculous a generation ago.

KISER, C. V. Recent Trends in Birth Rates among Foreign and Native White Married Women in Up-State New York. Milbank Quarterly. 2:173 (Apr.), 1936.

Health Problems Created by Machines—Not a pretty, but a realistic picture of the industrial past is painted. We are wont to praise the past, underrate the present, and be anxious for the future. We must have faith, concludes the author, in the ability of each age to solve its problems and to rectify its mistakes.

OLIVER, T. Our Mechanistic Age. J. State Med. 54, 4:191 (Apr.), 1936.

The Answers Being Self-Evident!—In the 8 counties studied, the population in thousands per nurse varied from 5 to 35 (1 nurse per 2,000 being the standard to be reached some day!). As was to be expected, as the nurse spreads her services out thinner and thinner, the amount of effective educational work she can do per family becomes by the same token less and less. The paper closes with the very rhetorical question: Is it true economy to continue to give service to only a few rural families?

RANDALL, M. G. How Much Work Can a Rural Nurse Do? Milbank Memorial Quarterly. 14, 2:163 (Apr.), 1936.

Statesmanship in Public Health—After having commented upon a couple of thousand papers on health, the reviewer's eye easily becomes jaundiced, but there is yet hope when the spirit can rise to a statesmanlike presentation of the larger objectives in public hygiene. This is just that kind of a paper.

PARRAN, T., JR. Health Security. Milbank Quarterly. 14, 2:113 (Apr.), 1936.

Venereal Delinquents—Follow-up of delinquent venereal cases as practiced by the Baltimore Health Department is described; it should encourage other health departments to go and do likewise.

REINHARD, F. O., and FALES, W. T. Delinquent Patients in Venereal Disease Clinics. J.A.M.A. 106, 16:1377 (Apr. 18), 1936.

BOOKS RECEIVED

MEDICAL ASPECTS OF CRIME. By W. Norwood East. Philadelphia: Blakiston, 1936. 437 pp. Price, $6.50.

THE BALANCED DIET. By Logan Clendening. New York: Appleton-Century, 1936. 207 pp. Price, $1.50.

FAMILY BEHAVIOR. By Bess V. Cunningham. Philadelphia: Saunders, 1936. 471 pp. Price, $2.75.

SPORTS FOR RECREATION. Elmer D. Mitchell, Editor. New York: Barnes, 1936. 467 pp. Price, $2.50.

THE ANATOMY OF PERSONALITY. By Howard W. Haggard and Clements C. Fry. New York: Harper, 1936. 357 pp. Price, $3.00.

MY LIFE AND WORK. By Dr. Adolf Lorenz. New York: Scribner, 1936. 362 pp. Price, $3.50.

THE NORMAL AND HEALTHFUL LIVING. By W. D. Sansum. New York: Macmillan, 1936. 250 pp. Price, $2.00.

WHOLESOME LIVING SERIES. By Jesse Feiring Williams and Theresa Dansdill. New York: Sanborn, 1935.

Health and Happiness, Third Grade	$.64
Health and the Rules of the Game, Fourth Grade	.64
Health and Control, Fifth Grade	.68
Health and Service, Sixth Grade	.72
Health and Ideals, Seventh or Eighth Grade	.80

ASSOCIATION NEWS

HEALTH CONSERVATION CONTESTS FOR 1935

THE Chamber of Commerce of the United States at its Annual Meeting in Washington, D. C., April 27, distributed the annual awards to the first place cities and counties in the City and Rural Health Conservation Contests, conducted by that Chamber and the American Public Health Association. The cities and counties receiving honorable mention in their respective population groups and geographical divisions were named and it was announced that the diplomas awarded them would be forwarded at a later date. The awards to the first ranking cities and counties are handsome plaques. Four special awards were given to four cities which, having won a first award twice, are placed in a special group and are given a diploma provided the previous high record in health work has been maintained.

The newly appointed Surgeon General of the U. S. Public Health Service, Thomas Parran, M.D., made the presentations, Harper Sibley of Rochester, N. Y., President of the National Chamber, being in the chair.

The following is the list of winners for 1935:

CITY CONTEST

Group I

First Award	*Honorable Mention*
Detroit, Mich.	Milwaukee, Wis. Pittsburgh, Pa.

Group II

First Award	*Honorable Mention*
Oakland, Calif.	Minneapolis, Minn. Dallas, Tex.

Group III

First Award	*Honorable Mention*
Syracuse, N. Y.	New Haven, Conn. Springfield, Mass. Grand Rapids, Mich. Reading, Pa. Honolulu, Hawaii Hartford, Conn. Duluth, Minn. Yonkers, N. Y. Tacoma, Wash.

Group I—Cities of over 500,000 population
" II—Cities of 250,000 to 500,000 population
" III—Cities of 100,000 to 250,000 population
" IV—Cities of 50,000 to 100,000 population
" V—Cities of 20,000 to 50,000 population
" VI—Cities under 20,000 population

Group IV

First Award	*Honorable Mention*
Schenectady, N. Y.	Pasadena, Calif. Evanston, Ill. Waterbury, Conn. New Rochelle, N. Y. Kalamazoo, Mich. Greensboro, N. C. Binghamton, N. Y. Sacramento, Calif. Saginaw, Mich.

Group V

First Award	*Honorable Mention*
Brookline, Mass.	Auburn, N. Y. Greenwich, Conn. Watertown, N. Y. Santa Barbara, Calif. Pittsfield, Mass. Plainfield, N. J. Ithaca, N. Y.

Group VI

First Award	*Honorable Mention*
Hibbing, Minn.	Englewood, N. J. Blackwell, Okla. Miami Beach, Fla.

Cities obtaining special diplomas: Baltimore, Md., Hackensack, N. J., Newark, N. J., and Palo Alto, Calif.

RURAL CONTEST

Northeastern Division

First Award	*Honorable Mention*
Westchester Co., N. Y.	Cattaraugus Co., N. Y. Southern Berkshire District, Mass. Cortland Co., N. Y. Ottawa Co., Mich. Richland Co., Ohio

Eastern Division

First Award	*Honorable Mention*
Davidson Co., Tenn.	Kent Co., Md. Forsyth Co., N. C. Fayette Co., Ky. Sullivan Co., Tenn. Rutherford Co., Tenn. Wicomico Co., Md. Madison Co., Ky. Shelby Co., Tenn.

Southeastern Division

First Award	*Honorable Mention*
Glynn Co., Ga.	Pike Co., Miss. Charleston Co., S. C. Lauderdale Co., Miss.

North Central Division

First Award	*Honorable Mention*
Shawnee Co., Kans.	No honorable mention was given in this division.

South Central Division

First Award	*Honorable Mention*
El Paso Co., Tex.	Dallas Co., Tex. Nolan Co., Tex. Potter Co., Tex. Rapides Parish, La.

Western Division

First Award	*Honorable Mention*
Santa Barbara Co., Calif.	Los Angeles Co., Calif. Santa Clara Co., Calif. Spokane Co., Wash.

In making the presentations, Dr. Parran took occasion to emphasize the special opportunities for advancement in public health work at the present time, the marked interest being shown in health betterment by business men, and the necessity of even the best organized cities and counties making further progress, as the obtaining of an award was not to lead to self complacency, because the awards did not signify perfection, but were to be regarded as incentives and stimulants for higher attainments.

ADDENDUM

In connection with the Rural Contest for 1936 attention is called to the recent provision made by the Contest Committee to enable every county and district with full-time health service to participate. Health units having within their bounds a chamber of commerce or business organization which has membership in the National Chamber of Commerce at Washington are as heretofore to be enrolled by their local business group. Those units which have no such business group to sponsor them may enroll through the Committee on Administrative Practice of the American Public Health Association.

COMMITTEE ON THE HYGIENE OF HOUSING

A NEW committee of the Association has been created to be known as the Committee on the Hygiene of Housing. Abel Wolman, Chairman of the Committee on Research and Standards, appointed the committee with the knowledge of the Executive Board and Prof. C.-E. A. Winslow of Yale University is Chairman. Other members of the committee include R. H. Britten, Senior Statistician, U. S. Public Health Service, Washington, D. C.; A. R. Clas, Director of Housing, Federal Emergency Administration of Public Works; Col. J. I. Connolly of the Chicago Department of Health; Robert L. Davison, Director of Housing Research, John B. Pierce Foundation, New York, N. Y.; J. Andre Fouilhoux, architect, New York, N. Y.; Greta Gray, University of Southern California, Los Angeles, Calif.; James E. Ives, Ph.D., Senior Physicist, U. S. Public Health Service, Washington, D. C.; and H. A.

Whittaker, Sanitary Engineer, State Department of Health, Minneapolis, Minn.

This committee was set up in conformity with a request from Frank G. Boudreau, M.D., of the Health Section of the League of Nations, Geneva, and will serve as a committee of reference in the United States for the coöperative work of the Health Section on housing.

At the first meeting of this committee held in New York on May 15, Mr. Britten was appointed Secretary, and each member representing some special aspect of the housing problem was asked to prepare a memorandum on his subject which could be circulated for a preliminary statement of objectives in order that basic minimum but adequate standards for housing could be set up on a scientifically planned basis. The committee has in mind a long range scheme for promoting the hygiene of housing and it is probable that several other phases of the subject will be represented in the committee as finally constituted.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

David H. Andrew, M.D., Wytheville, Va., County Health Officer

Charles J. Ball, 211 City Hall Annex, New Orleans, La., Assistant Superintendent of Public Health

Adrian L. Carson, Jr., M.D., Fairfax, Va., County Health Officer

Wallace M. Chapman, M.D., 204 Liberty, Glasgow, Ky., Director, Barren County Health Dept.

Karl C. Eberly, M.D., 310 Wayne Pharmacal Bldg., Fort Wayne, Ind., Director, Dept. of Public Health

George M. Fraser, M.B., City Bldgs., Peterborough, Ont., Canada, Medical Officer of Health

Shockley, DeW. Gardner, M.D., Valley Health District, Harrisonburg, Va., Health Officer

Roy T. Hansen, M.D., 7608 W. State St., Wauwatosa, Wis., City Health Commissioner

George W. Hemmeter, M.D., 3002 Garrison Blvd., Baltimore, Md., Health Officer, Western Health District, City Health Dept.

James A. Henderson, M.D., 624 Maison Blanche, New Orleans, La., Chief Sanitary Officer, City Board of Health

Jacob H. Landes, M.D., 590 E. 138 St., New York, N. Y., Supervisor, Bureau of School Hygiene, New York City Dept. of Health

Hugh C. McRee, M.D., Opelika, Ala., County Health Officer

C. H. Munger, M.D., Emporia, Kans., County Health Officer

Byron F. Porter, M.D., Caribou, Me., District Health Officer

Jacob Rosenbluth, M.D., 356 E. 8th St., New York, N. Y., Chief Diagnostician, New York City Dept. of Health

Wallace W. Ryall, M.D., City Bldg., Youngstown, O., Commissioner of Health

Charles L. Savage, M.D., c/o Miss Verna Routh, Lebanon, Va., Health Officer

Mack I. Shanholtz, M.D., Dept. of Health, Bristol, Va., Health Officer

Bert L Stinson, M.D., New Iberia, La., Director, Iberia Parish Health Unit

Laboratory Section

Vera M. Crossley, 80 Lawton Blvd., Toronto, Ont., Canada, Assistant Bacteriologist, Ontario Dept. of Health

Dan R. Gonzalez, 2900 Blanche St., Pasadena, Calif., Director of Laboratory, Las Encinas Sanitarium

Mattie P. Henderson, 1502 E. Fifth Ave., Knoxville, Tenn., Laboratory Technician, Tennessee Valley Authority

John F. Kessel, School of Medicine, University of Southern California, Los Angeles, Calif., Professor of Bacteriology

William H. Potts, D.V.M., Health Dept., Goldsboro, N. C., Milk and Food Inspector, Wayne County Health Dept.

Philip Reichert, M.D., 4 E. 88 St., New York, N. Y., Director of Clinical Laboratory 527, New York City Dept. of Health

Charles R. Rein, M.D., 580 Fifth Ave., New York, N. Y., Consulting Serologist, U. S. Public Health Service

Frank W. Schofield, D.V.S., College Heights, Guelph, Ont., Canada, Professor of Bacteriology, Ontario Veterinary College

Jesse W. Stevens, 616 E. Grove St., Ontario, Calif., Bacteriologist, Research Dept., California Fruit Growers Exchange

Luther Thompson, Ph.D., Mayo Clinic, Rochester, Minn., Laboratory Diagnosis of Communicable Diseases
Martha E. Thompson, State Cooperative Laboratory, Superior, Wis., Director
Wyeth S. Wallace, Box 47, Sheffield, Ala., Field Medical Technician, Tennessee Valley Authority
Maurice W. Yale, Ph.D., New York Agr. Exp. Station, Geneva, N. Y., Associate in Research

Vital Statistics Section

Clara E. Councell, 2411 N. Charles St., Baltimore, Md., Statistician, Bureau of Vital Statistics, State Dept. of Health
Clark Tibbitts, 153 E. Elizabeth St., Detroit, Mich., Field Director, U. S. Public Health Service Health Inventory

Public Health Engineering Section

John B. Belknap, State Dept. of Health, Gouverneur, N. Y., District Sanitary Engineer
John E. Kiker, Jr., 611 Professional Bldg., Baltimore, Md., Chemical and Sanitary Engineer
Harry A. Faber, 50 E. 41 St., New York, N. Y., Sanitary Engineer, Chlorine Institute, Inc.
John M. Henderson, C.E., P. O. Box 344, Brunswick, Ga., Division Engineer, State Dept. of Health
Harry C. Kneeland, 51 S. Jackson St., Pittsburgh, Pa., Technical Supervision of Swimming Pools and Water Works
Howard W. Lundy, 285 Brookline, Cambridge, Mass., Candidate for Doctor of Public Health Degree, Massachusetts Institute of Technology
Alexander H. Zimmerman, 5147 N. St. Louis Ave., Chicago, Ill., Ventilation Engineer, Board of Health

Industrial Hygiene Section

P. Wilcox Gumaer, 25 Garden St., West Englewood, N. J., Consulting Engineer—prevention of occupation diseases
Frederick S. Mallette, 169 S. Grove St., Ypsilanti, Mich., Supervisor, Plant Survey Interpretation, U. S. Public Health Service
O. A. Sander, M.D., 710 N. Plankinton Ave., Milwaukee, Wis., Industrial Physician

Food and Nutrition Section

Bertrand E. Bennison, 54 Marion St., Brookline, Mass., Student, Massachusetts Institute of Technology
Henry J. Rugo, 321 Norfolk Ave., Dorchester, Mass., Student, Massachusetts Institute of Technology

Child Hygiene Section

Marion W. Caskey, M.D., Ph.D., Taylorsville, Ky., Director of Health, Spencer County
Prescott T. Hill, M.D., 225 Broad St., Providence, R. I., Medical Inspector, Public Schools

Public Health Education Section

Clifford H. Bowman, P. O. Box 916, Hilo, Hawaii, Division Supervisor, Bureau of Sanitation, Board of Health, Territory of Hawaii
Alejandro Casuso, M.D., Malecon 250, Havana, Cuba, Professor of Hygiene, Medical School, University of Havana
John R. MacElroy, M.D., Jonesville, N. Y., Health Officer
Donald J. MacGillivray, M.D., 4 Lyndhurst St., Dorchester Centre, Mass., formerly Health Officer, Portland, Conn.
Albert B. McCreary, M.D., Eastville, Va., Director, Northampton Health Unit
William M. Randolph, M.D., Route 2, Charlottesville, Va., Clinician, Out-Patient Tuberculosis Service, State Dept. of Health
Robert E. Schneider, M.S.P.H., 81 Marlboro St., Waterbury, Conn., Teacher of Health Education, Schenectady, N. Y., Public Schools

Public Health Nursing Section

Ichiyo Nakamaru, P. O. Box 184, Pahala, Kau, Hawaii, Public Health Nurse, Board of Health, Territory of Hawaii
Mary E. Smith, R.N., Bureau of Public Health, Santa Fe, N. Mex., Superintendent, Public Health Nursing
Gladys V. Solveson, R.N., Western Navajo Area, Tuba City, Ariz., Field Nurse, U. S. Indian Service
Hazel J. Tucker, R.N., 1027 Lincoln Ave., Toledo, O., Supervisor of WPA Nutrition and Health Clinic

Epidemiology Section

Joaquin Fernandez y Melendez, Apartado 157, Habana, Cuba, Director de Campo de la Comision de Malaria de Cuba
Percy T. Watson, M.D., Box 215, Cass Lake, Minn., Local Medical Director, Chippewa Health Unit, State Board of Health

Unaffiliated

B. Russell Franklin, C.P.H., 43 Highland Ave., Ayer, Mass., Milk and Sanitary Inspector, Nashoba Associated Boards of Health
Frederick Schultz, Box 3378, Honolulu, T. H., Division Supervisor, Bureau of Sanitation, Board of Health, Territory of Hawaii

Nelson K. Spencer, Board of Health, Honolulu, T. H., Sanitary Inspector
John W. K. Wright, Territorial Board of Health, Honolulu, T. H., Senior Agricultural Aide

DECEASED MEMBERS

Robert B. Morse, Hyattsville, Md., Elected Member 1915, Fellow 1922
C. N. McCloud, M.D., St. Paul, Minn., Elected Member 1919
Carl A. Nowak, St. Louis, Mo., Elected Member 1932
James S. Walton, M.D., Amsterdam, N. Y., Elected Member 1935
Jules Constantin, M.D., D.P.H., Roberval, P. Que., Elected Member 1933
Gertrude M. DeWitt, Chicopee, Mass., Elected Member 1920
Andronique Lafond, M.D., D.P.H., Parisville, P. Que., Canada, Elected Member 1933
Leslie Wentzel, Scranton, Pa., Elected Member 1922
Roger G. Perkins, M.D., Wakefield, R. I., Elected Member 1902, Fellow 1922, Life Member 1929
Edgar Sydenstricker, New York, N. Y., Elected Member 1917, Fellow 1922
Joseph B. Garlick, M.D., Schenectady, N. Y., Elected Member 1935.

CLOSING DATE FOR FELLOWSHIP APPLICATIONS

THE Committee on Fellowship and Membership wishes to announce that September 1 is the closing date for accepting Fellowship applications for action at the New Orleans Annual Meeting. Eligible members who desire to apply for Fellowship this year are requested to submit their applications to the committee as much in advance of September 1 as possible.

SCIENTIFIC EXHIBITS IN NEW ORLEANS

EXCELLENT accommodations for exhibits has been promised by the Association Committee on Scientific Exhibits for the 65th Annual Meeting of the American Public Health Association in New Orleans, October 20–23. The local committee has been active, and under the leadership of Dr. Joseph R. D'Aunoy, the number and kinds of exhibits are expected to exceed last year's. Exhibits have been promised by the U. S. Public Health Service and the U. S. Children's Bureau. Health problems peculiar to the South will receive special attention and, in addition, an unusual exhibit on leprosy will be included.

One of the excellent features of the scientific exhibits in Milwaukee was the group of laboratory exhibits secured by the special Laboratory Section committee on exhibits under the direction of Dr. Fred O. Tonney. Following this experience, the other Sections of the Association have been requested to designate similar representatives to assure a representative scope of exhibits. Four Sections have made these appointments:

Industrial Hygiene—Bernard S. Coleman
Laboratory—Fred O. Tonney, M.D.
Engineering—A. H. Fletcher
Public Health Nursing—Marguerite A. Wales

The efforts of these individuals will bear fruit next October in a larger assortment of exhibits from each of these fields as well as in special exhibits of general interest. It is expected that other Sections will designate representatives to assure representation of their fields in the Scientific Exhibits.

Exhibitors this year will receive citations of merit not only on a basis of exhibit content but also on method of presentation.

Exhibit information blanks will be sent on request to the Committee on Scientific Exhibits, American Public Health Association, 50 West 50th Street, New York, N. Y.

NEWS FROM THE FIELD

NEW MEXICO MEETING

THE Annual Meeting of the New Mexico Public Health Association, in joint session with the Medical Society of New Mexico, was held in Carlsbad, N. M., May 6–8, under the presidency of Elroy F. McIntyre, M.D., member A.P.H.A., Health Officer of Santa Fe.

Among the speakers from outside the state were: Karl F. Meyer, Ph.D., member A.P.H.A., of San Francisco; W. W. Bauer, M.D., F.A.P.H.A., of the American Medical Association, Chicago; Thomas J. McCamant, M.D., member A.P.H.A., Health Officer of El Paso, Tex.; and Reginald M. Atwater, M.D., Executive Secretary of the American Public Health Association.

Officers for the coming year were elected as follows:

President: James R. Scott, M.D., F.A.P.H.A., Albuquerque
Vice-President: Emma S. Maylor, R.N., member A.P.H.A., Fort Sumner
Secretary-Treasurer: Paul S. Fox, C.E., F.A.P.H.A., Santa Fe

The program included special consideration of undulant fever as it appears in the Southwest, as well as problems of tuberculosis, trachoma, meningitis, and public health education, and included several phases of malaria control.

GORGAS ESSAY WINNER

HELEN COLLENTINE, Messmer High School, Milwaukee, Wis., was awarded the prize of $500 and a trip to Washington for her essay on "Gorgas' Control of Transmissible and Other Preventable Diseases." Bronze medals were awarded for the best essay in each high school.

A new contest will be opened next October. For information write to Gorgas Memorial Institute, Washington, D. C.

THIRD PAN AMERICAN CONFERENCE OF NATIONAL DIRECTORS OF HEALTH

THE Third Pan American Conference of National Directors of Health held its sessions in Washington, D. C., April 6 to 13. The following delegates were in attendance:

Argentina, Dr. Miguel Sussini; Brazil, Dr. João Barros Barreto; Chile, Dr. Víctor Grossi; Colombia, Dr. Enrique Torres; Costa Rica, Dr. Solón Núñez, Dr. Mariano Rodríguez Alvarado; Cuba, Dr. Domingo Ramos; Dominican Republic, Dr. Rafael Espaillat de la Mota; Guatemala, Lic. Enrique López Herrarte; Haití, Dr. Rulx León; México, General José Siurob, M.D., Dr. Ernesto Cervera, Dr. Gerardo Varela; Nicaragua, Dr. Emigdio Lola; Perú, Dr. Carlos Monge; United States, Dr. Hugh S. Cumming, Dr. Thomas Parran, Dr. F. A. Carmelia, Dr. W. L. Treadway, Dr. R. C. Williams, Dr. John D. Long, Dr. Bolívar J. Lloyd, Dr. George W. McCoy, Dr. J. P. Leake, Dr. C. L. Williams, Dr. L. L. Williams, Dr. J. W. Mountin; Uruguay, Dr. Justo F. González; Venezuela, Dr. Arnoldo Gabaldon.

The subjects discussed were as follows: Coördination of Policies and Activities of Federal, State and Municipal Departments of Health; Appropriations for Health Work, Allocations of Funds; Yellow Fever; Tuberculosis, Vaccines; Amebiasis and Bacillary Dysenteries; Vital Statistics;

School and Industrial Hygiene; Modern Trends in Public Health; The Narcotic Problem; Maternal and Child Welfare; Rural Sanitation; The Venereal Diseases; Nutrition; Bubonic Plague; Poliomyelitis; Milk and its Relation to the Public Health; Trachoma and Onchocerciasis; Quarantine Measures; Life in High Altitudes; Leprosy; Malaria.

SUMMER SIGHT SAVING CLASSES

THE National Society for the Prevention of Blindness has announced that courses for the training of teachers and supervisors of sight-saving classes will be offered at the 1936 summer sessions of the following:

University of Cincinnati, Cincinnati, Ohio—June 22–July 28.

University of California at Los Angeles, West Los Angeles, Calif.—June 27–Aug. 7.

State Normal School, Oswego, N. Y.—June 29–Aug. 7. Course to be given in Syracuse, N. Y.

Teachers College, Columbia University, New York, N. Y.—July 7–August 14.

Details regarding the courses may be obtained from the university or college.

A.M.A. ELECTS NEW PRESIDENT

AT the meeting of the American Medical Association in Kansas City, Mo., May 11–15, the House of Delegates authorized Dr. James S. McLester, of Birmingham, Ala., President, to announce Dr. J. Tate Mason of Seattle, Wash., President-Elect, as the new President, without the usual installation ceremonies, due to the critical illness of Dr. Mason. Dr. McLester will act as President for the present. Dr. John H. J. Upham, of Ohio State University, was made President-Elect. Dr. Charles Gordon Heyd, Professor of Surgery, Post-Graduate Medical School and Hospital, New York, was elected Vice-President.

The Meeting was considered one of the best the American Medical Association has held. There were many good papers, especially on encephalitis and poliomyelitis. The scientific exhibits were truly marvelous.

PUBLIC HEALTH ASSOCIATION OF NEW YORK CITY

THE Public Health Association of New York City was organized on May 18 at a meeting in the Department of Health. Made up entirely of New York City members of the American Public Health Association, the new organization aims to bring this group into closer contact with the activities of the parent Association, to encourage the scientific advancement of its members in the field of public health and to aid the development of the public health movement in this city.

Officers elected were:

President—Donald B. Armstrong, M.D.
1st Vice-President—John L. Rice, M.D.
2nd Vice-President—Hazel Corbin
Secretary-Treasurer—Frank Kiernan

George T. Palmer, Dr.P.H., Deputy Commissioner of Health of the City of New York and chairman of the organization Committee, said:

The need for a local affiliated branch of the American Public Health Association has been strongly urged by many leading public health workers in New York City. The American Public Health Association has 5,000 members and these are distributed over the United States, Canada, Mexico, and Cuba. One-tenth, or nearly 500 of its membership, is located in New York City. Problems arise in this great metropolitan center which demand a closer understanding and exchange of viewpoints among public health workers in the official agencies, the schools, the medical, engineering, social welfare, and other scientific bodies in the city. This new organization will make this possible. Then there comes the question of the Annual Meetings of the parent Association which are often held at long distances. The New York local chapter of the A.P.H.A. will provide an opportunity for local conferences similar to those held annually by the New York State Health Officers at Saratoga Springs. Experience in various parts of the country prove

such regional meetings eminently successful, and the New York City chapter will, it is hoped, fill a long felt need.

New York City was the birthplace of the American Public Health Association, the organization taking place on September 12, 1872. Dr. Stephen Smith, an outstanding public health authority and usually regarded as the father of the present Department of Health, was its first President.

PERSONALS

ALFRED G. LONG, M.D., F.A.P.H.A., former Director of the Diagnostic Laboratory, Maine State Board of Health, has been appointed Director of Laboratories for the Good Samaritan and Howard County Hospitals, Kokomo, Ind.

LAWRASON BROWN, M.D., F.A.P.H.A., Consulting Physician, Trudeau Sanatorium, Saranac Lake, N. Y., will be awarded the honorary degree of Doctor of Science by the Medical College of Virginia, Richmond, Va., at their commencement exercises on June 2.

DR. HARRY G. SOUTHARD, of Marysville, Ohio, formerly State Health Director, has been appointed Health Officer of Union County, to succeed Dr. John D. Boylan, of Milford Center (incorrectly stated as of Noble County in the April issue, page 453).

DR. BENJAMIN SCHWARTZ has been appointed Chief of the Zoölogical Division of the Bureau of Animal Industry, U. S. Department of Agriculture. Dr. Schwartz, who has been Assistant Chief of that Division since 1932, succeeds Dr. Maurice C. Hall, now with the National Institute of Health, of the Treasury Department, Washington, D. C.

DR. HOWARD B. METTEL, of Indianapolis, Ind., has been appointed Director of the Department of Child and Maternal Health of the Indiana State Division of Public Health.

DR. JOHN W. DUGGER, of Jackson, Miss., has been named Director of the Pearl River County Health Unit, succeeding Dr. George E. Godman, of Poplarville, resigned.

DR. J. W. MORELAND, of Carpio, N. Dak., has been appointed Health Officer of Ward County, succeeding Dr. Henry L. Halverson, of Minot, resigned.

DR. THOMAS M. PARKINS, of Staunton, Va., has been appointed Health Officer to succeed Dr. James Fairfax Fulton.

DR. ETHAN B. PFEFFERKORN, of Oshkosh, Wis., has been appointed Assistant State Health Officer, to succeed Dr. Guy W. Henika, of Madison.

KENNETH F. MAXCY, M.D., Fellow A.P.H.A., of the University of Virginia, University, Va., has been appointed, by the Board of Regents of the University of Minnesota, Professor and head of the Department of Preventive Medicine and Public Health of the University of Minneapolis. Dr. Maxcy will assume his duties during the coming summer.

ELSBETH H. VAUGHAN, R.N., Fellow A.P.H.A., of St. Louis, Mo., was presented with the Florence Nightingale Medal by Admiral Carey T. Grayson, in recognition of outstanding nursing service, at the annual meeting of the American Red Cross, in Chicago in May.

HENRY GRADY CALLISON, M.D., F.A.P.H.A., Commissioner of Health of Richmond County, Ga., since 1933, has accepted a position as Director of the field training unit personnel of the South Carolina State Department of Health, with offices at Columbia, S. C. Dr. Thomas B. Phinizy is Acting Commissioner.

CONFERENCES AND DATES

June 4–6, American Dermatological Association, Swampscott, Mass.
June 5, 6, Eleventh Annual Meeting of the New England Health Education Association, Massachusetts Institute of Technology, Cambridge, Mass.
June 6–Nov. 29, Medical Exhibit, "Story of Life," in Texas Centennial Exposition, Dallas, Tex.
June 8–12, Annual Convention of American Water Works Association, Hotel Biltmore, Los Angeles, Calif.
June 9–12, National Conference on Weights and Measures, Bureau of Standards, Washington, D. C.
June 10, Spring Meeting of the New York State Sewage Works Association, Lido Beach, L. I., N. Y.
June 11–12, Annual Meeting, Illinois Association of Sanitary Districts, Fox Hotel, Elgin, Ill.
June 12–13, Annual Convention, Pennsylvania Association of Planning Commissioners, Williamsport, Pa.
June 15–Aug. 21, Speech Conference, University of Denver, Denver, Colo.
June 16–18, Tenth Iowa Conference on Child Development and Parent Education, Iowa City, Iowa.
June 20–26, Canadian Medical Association, Victoria, B. C.
June 21–26, Biennial Convention of the American Nurses' Association, the National League of Nursing Education, and the National Organization for Public Health Nursing, Los Angeles, Calif. Headquarters will be, respectively: A.N.A., and N.L.N.E., Ambassador Hotel; N.O.P.H.N., Biltmore Hotel.
June 22–23, Conference of State and Provincial Health Authorities of North America, Vancouver, B. C.
June 22–25, National Conference on Visual Education and Film Exhibition (DeVry Foundation). Francis W. Parker School, Chicago, Ill.
June 22–25, Annual Meeting of the National Association of Master Plumbers, Hotel Statler, Buffalo, N. Y.
June 23–25, Annual Conference of Health Officers and Public Health Nurses, Saratoga Springs, N. Y.
June 24–26, Annual Conference, Pennsylvania Sewage Works Association, State College, Pa.
June 24–26, Annual Convention of Union of Alberta Municipalities, Lethbridge, Alta., Canada.
June 24–27, Seventh Annual Meeting, Western Branch, A.P.H.A.—meeting simultaneously with Canadian Public Health Association—Vancouver and Victoria, B. C. Hotel Vancouver.
June 26–27, Annual Meeting, New England Association of Commercial Executives, Pittsfield, Mass.
June 27–July 2, National Education Association, Portland, Ore.
June 28–July 2, Annual Meeting, National Education Association of the United States, Portland, Ore.
July, Third International Conference on Social Work Problems, London.
July 6–10, 29th Annual Meeting of the American Home Economics Association, Olympic Hotel, Seattle, Wash.
July 6–11, The Royal Sanitary Institute, Southport, England.
July 13–17, American Dental Association, San Francisco, Calif.
July 18–23, Third International Open Air School Congress, Bielefeld and Hanover, Germany.
July 25–Aug. 1, The Second International Congress of Microbiology, London.
July 27–29, Annual Meeting, Union of Canadian Municipalities, Vancouver, B. C.
Aug. 2–8, Annual Meeting, National Institute for Commercial and Trade Organization Executives, Northwestern University, Evanston, Ill.

Aug. 11–14, American Veterinary Medical Association, Deshler-Wallick Hotel, Columbus, O.

Aug. 16–22, National Hospital Association, Philadelphia, Pa.

Aug. 16–22, National Medical Association, Philadelphia, Pa.

Aug. 19–21, Annual Meeting—Central States Section, American Water Works Association, Hotel Cleveland, Cleveland, Ohio

Aug. 31–Sept. 12, Harvard Tercentenary Conference of Arts and Sciences, Cambridge, Mass.

Sept. 7–10, International Union Against Tuberculosis, Lisbon, Portugal.

Sept. 15–30, First International Congress of Sanatoria and Private Nursing Homes; Margitsziget, Sanatorium, Budapest, Hungary.

Sept. 21–23, Annual Convention, American Institute of Park Executives and the American Park Society, South Bend, Ind.

Sept. 22–25, Annual Meeting—New England Water Works Association, Pennsylvania Hotel, New York, N. Y.

Sept. 23–25, Annual Meeting of the New York State Association of Dairy and Milk Inspectors, Van Curler Hotel, Schenectady, N. Y.

Sept. 28–30, Public Works Congress—American Society of Municipal Engineers—International Association of Public Works Officials, Toronto, Ont.

Sept. 28–Oct. 2, American Hospital Association, Cleveland, O.

Sept. 29–Oct. 3, First International Conference on Fever Therapy, Columbia University, New York, N. Y.

Oct. 5–9, Annual Safety Congress and Exposition, National Safety Council, Atlantic City, N. J.

Oct. 10–18, National Dairy Show, Dallas, Tex.

Oct. 12–15, Annual Convention—Southwest Section, American Water Works Association, Fort Smith, Ark.

Oct. 12–17, The Dairy Industries Exposition, Atlantic City, N. J.

Oct. 12–18, Third International Congress on Malaria, Madrid, Spain.

Oct. 17–25, Centennial Exposition Dairy Show, Atlantic City, N. J.

Oct. 19–21, Annual Meeting, International City Managers' Association, Richmond, Va.

Oct. 20–23, Sixty-fifth Annual Meeting of the American Public Health Association, New Orleans, La. Meetings Headquarters, Municipal Auditorium; Residence Headquarters, Hotel Roosevelt.

Oct. 20–23, American Association of School Physicians, Hotel Roosevelt, New Orleans, La.

Oct. 21–23, Ontario Hospital Association, Toronto, Ont.

Oct. 26–28, Annual Meeting—Missouri Valley Section, American Water Works Association, Kansas City, Mo.

Oct. 26–28, National Association of Exterminators & Fumigators, Cleveland, Ohio.

Oct. 29–31, Annual Meeting of the Association of Military Surgeons, Detroit, Mich.

Nov. 8–11, Annual Meeting, National Association of Commercial Organization Secretaries, Omaha, Nebr.

Nov. 9–12, Association of Dairy, Food and Drug Officials of the United States, Miami Biltmore Hotel, Coral Gables, Fla.

Nov. 11–13, Refrigeration Service Engineers Society, Hotel Gayoso, Memphis, Tenn.

Nov. 17–20, Southern Medical Association, Baltimore, Md.

Dec. 28–30, Society of American Bacteriologists, Indianapolis, Ind.

Dec. 28, 1936–Jan. 2, 1937, American Association for the Advancement of Science, St. Louis, Mo.

Dec. 28–31, Second National Conference on College Hygiene, Washington, D. C.

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And The Nation's Health

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Engineers in Health Departments
HYDE

ERA and Public Health Nursing
MAC DOUGALL
METTINGER

Vitamin D in Child Health
TONNEY

Infectious Mononucleosis
STUART and MICKLE

Sixty-fifth Annual Meeting, New Orleans, La., October 20-23, 1936

Meeting Headquarters, Municipal Auditorium
Residence Headquarters, Hotel Roosevelt

Published by the

American Public Health Association

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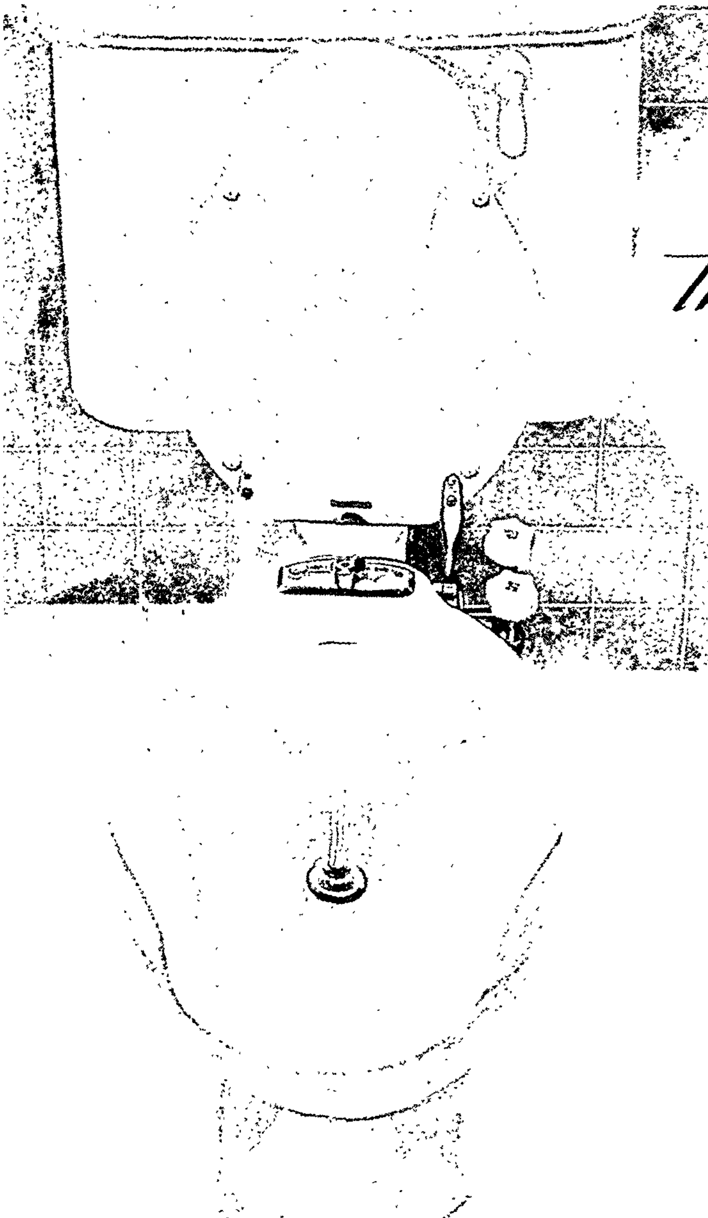
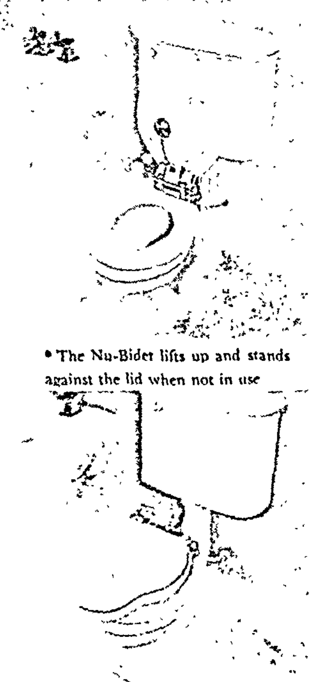
... and Now the **TRULY** Hygienic Bathroom





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● And whoever heard of a hygienic bathroom? And *fewever* heard of a bidet, for that matter.

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Once you see the Nu-Bidet (Nu-*Bee*-day) you, too, will agree it is the most outstanding improvement in bathroom fixtures in the past twenty-five years.

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Sitz Bath for personal hygiene and treatment of rectal disorders. Spray for same purpose and for feminine hygiene.

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American Journal of Public Health

and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 26 July, 1936 Number 7

CONTENTS

Continued on page vi

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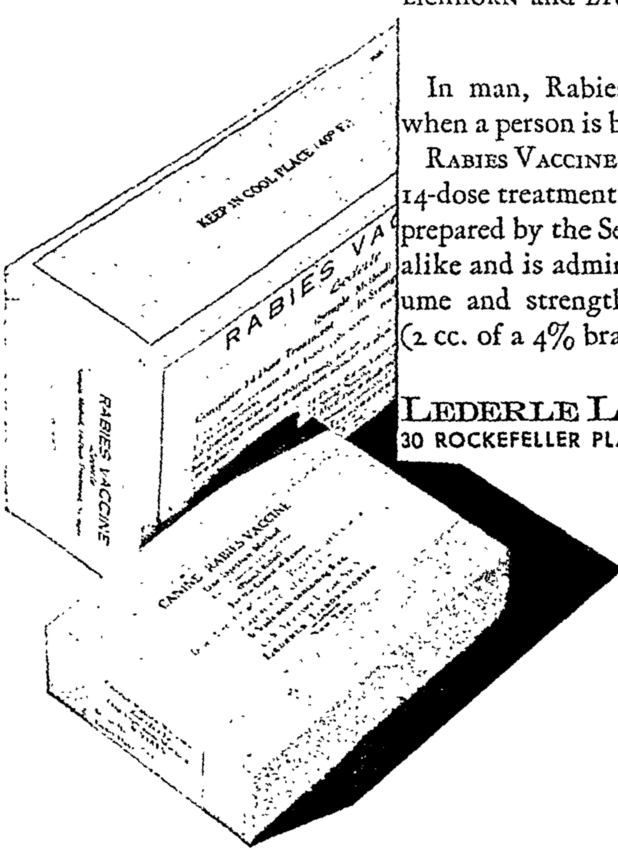

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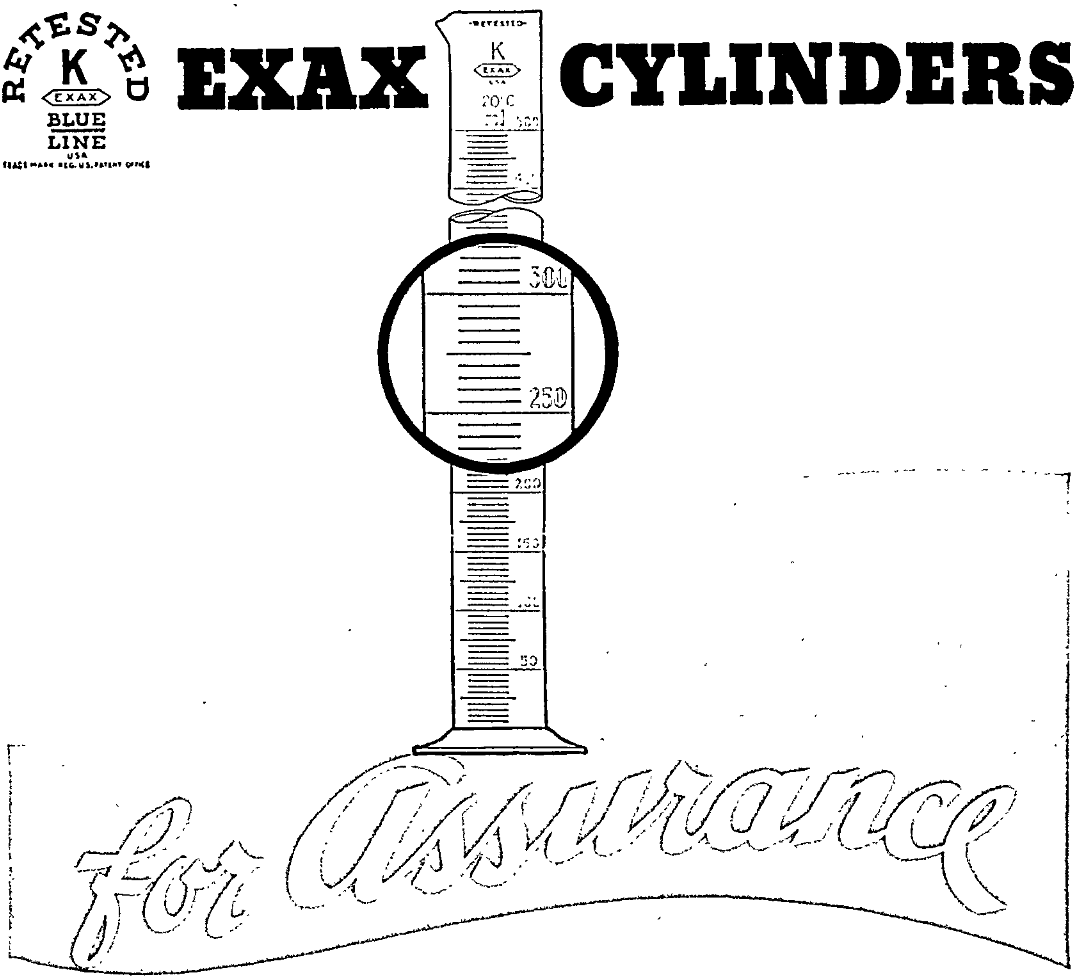

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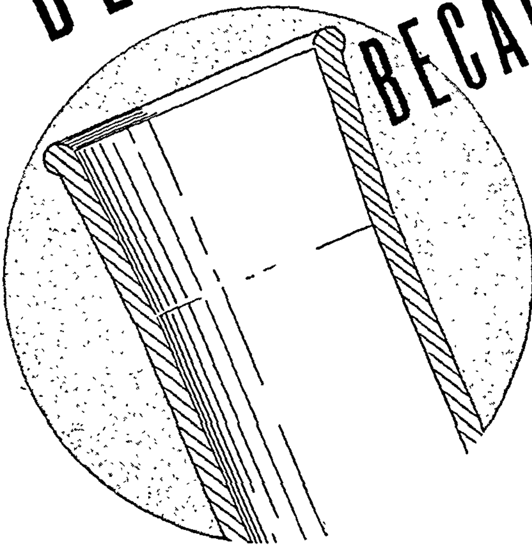

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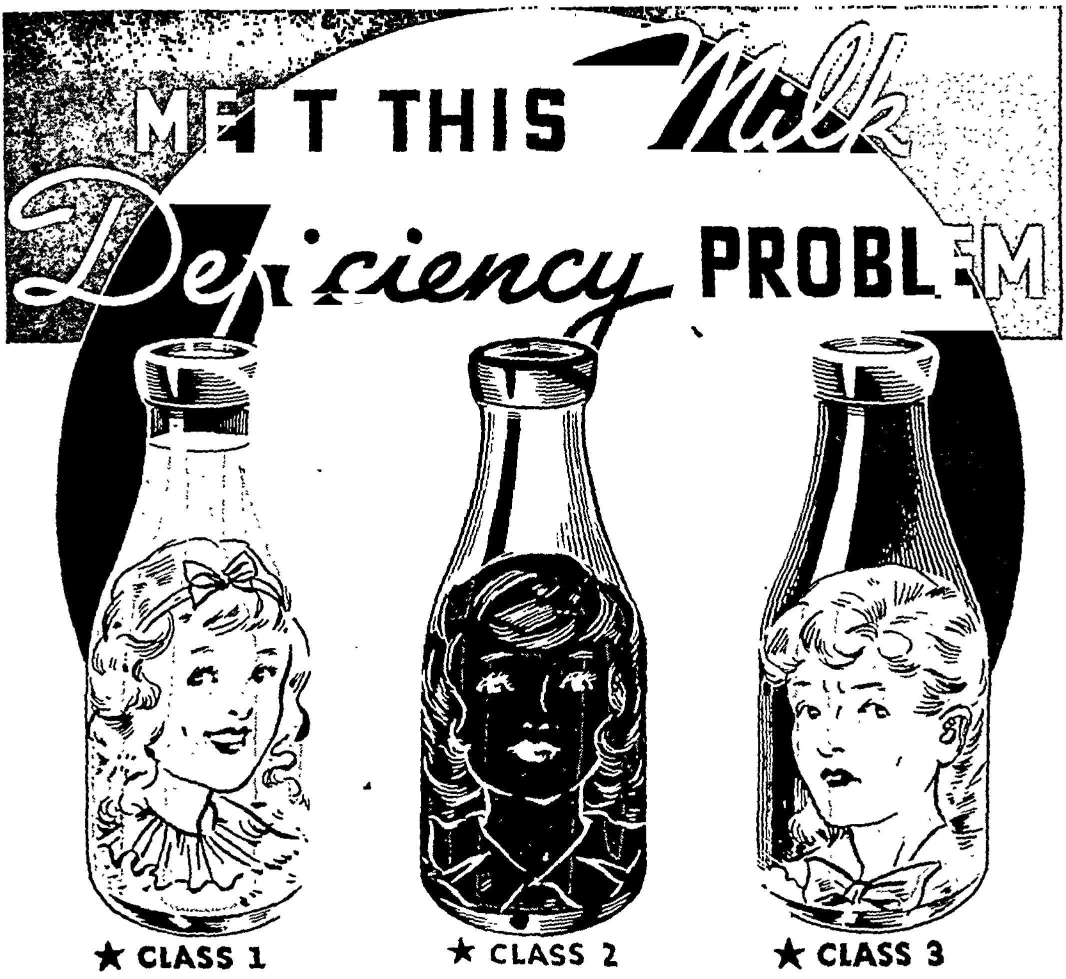

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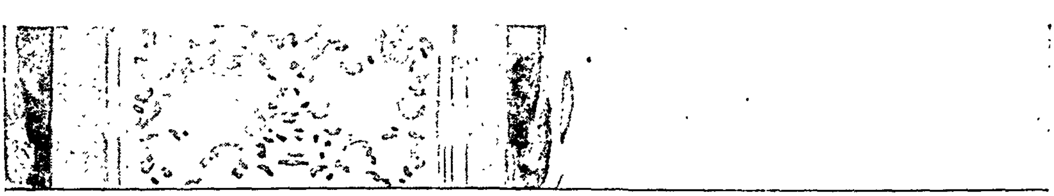
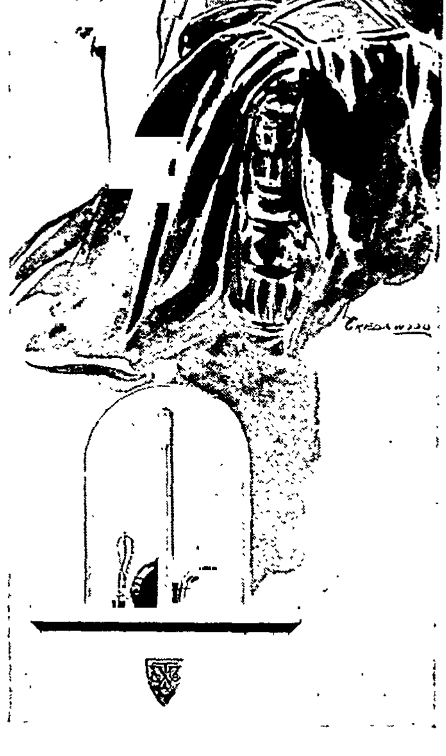




American Journal of Public Health
and THE NATION'S HEALTH

Volume 26 July, 1936 Number 7

Vitamin D in Child Health*

FRED O. TONNEY, M.D., F.A.P.H.A.
Director, Technical Service and Research, Board of Health, Chicago, Ill.

IT is the purpose of this article to review the more recent experimental data on vitamin D and child health, and point out the essential aspects of the public health problem of rickets. The influence of vitamin D upon the child's physical development is viewed from the standpoint of: (1) growth, (2) bone development, (3) tooth development, (4) posture, and (5) resistance to the infections.

GROWTH AND BONE DEVELOPMENT

The importance of vitamin D to normal growth probably depends upon its property of causing the absorption and utilization of lime salts from the food. Since the lime salts are the principal component of bone, and the size of the skeleton determines height and breadth, it follows of necessity, that vitamin D and lime salts are essential to growth.

There are two requisites for the normal development of bone: (1) ample lime and phosphorus in the diet, and (2) sufficient vitamin D to assure their adequate absorption. The vitamin D may be derived from (a) actinic sunshine, (b) artificial ultra-violet light, and (c) foods, either naturally or artificially fortified with this nutritional factor.

TEETH

With respect to tooth development, vitamin D and lime salts in adequate amounts, are both admittedly essential. As to dental decay, however, recent studies [1] seem to be of importance. These consisted of histological examinations of the teeth of 125 pregnant rats kept on rachitic and non-rachitic diets. The following conclusions were drawn:

A deficient calcium-phosphorus ration in the diet of the mothers, with even a partial deficiency of vitamin D caused improperly calcified teeth in the offspring. In this case, later addition of adequate amounts of vitamin D to the diet failed to correct the deficient calcification of the teeth, but did produce normal bone formation in the experimental animals. Diets with a calcium-phosphorus ration of Ca-1 to P-1.90 did not induce caries in the teeth, whether vitamin D was deficient or not.

On the subject of tooth deficiency and rickets, Eliot, Souther, Anderson,

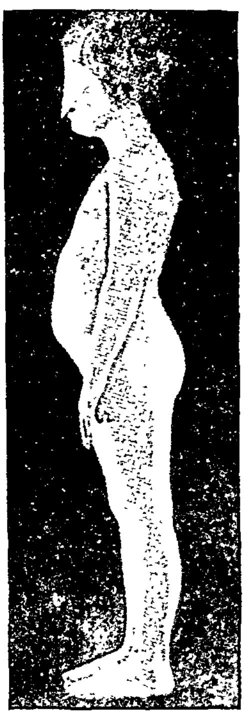
* Read at a Joint Session of the Food and Nutrition and Child Hygiene Sections of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

and Arnin,[2] recently studied the teeth of 450 children in New Haven. Enamel hypoplasia of the permanent teeth formed during infancy and early childhood, characterized by symmetrical distribution of the defects, was observed to be "regularly associated with rickets." Dental caries also, occurred more often in the rachitic children, than in the non-rachitic. Suitable antirachitic therapy was found to reduce the incidence of enamel hypoplasia decidedly, and also, to some extent, the dental caries.

POSTURE

With regard to posture, we quote Park and Eliot: [3]

> In the active and moderate stages of rickets, the muscles are characteristically flabby and lax. In addition, the neuro-motor development of normal growth is impaired, if the rickets is severe. In the milder stages of rickets, however, the neuro-motor development may proceed uninterruptedly.



(*Hygeia*, Mar., 1935, p. 222)

FIGURE I—A rachitic child in typical lax posture

Lax muscles necessarily cause a slump in posture. This is a matter of common observation. Figure I shows a rachitic child in a typically lax posture. Figure II shows a child with good muscle tonus, in a normal posture.

The point is, that a healthy child naturally assumes a correct posture, whereas a rachitic child, because of lax muscle tonus and faulty bone development, often stamps himself as abnormal by his posture alone.

SUSCEPTIBILITY TO INFECTION

Animal experiment — The accumulated material on increased susceptibility to infection in rickets, is now impressive. Of the more recent contributions, one is cited.[4]

A strain of *Bact. coli communis* was used. It was found that a 2 hour daily exposure to mid-day sun for a period of 4 weeks, markedly raised the resistance of young rachitic rats to infec-

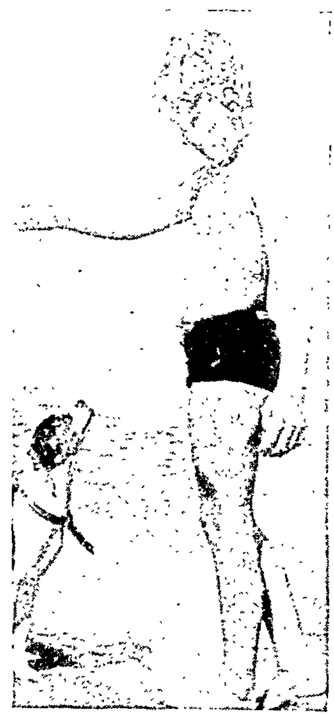


FIGURE II—A normal child with good muscle tonus in naturally assumed posture

tion with this organism. Of 263 sun-exposed rats, 57 per cent survived the inoculation, whereas of 241 controls not exposed, but 32 per cent survived the inoculation. Normal rats, however, were apparently not influenced by exposure to sunlight in their resistance to this infection. The author remarks that "apparently exposure to the sun does not increase the resistance of normal rats."

Brown and Tisdall[5] have reported a series of observations on the effect of a 2 hour daily exposure to sunshine upon rats inoculated with a special "low virulence" organism, previously isolated from albino rats. It was found that twice as many of the sunshine-exposed group survived intraperitoneal inoculation as did the control group, kept indoors away from sunshine.

Eichholz and Kreitmair[6] found that all of the rats fed diets deficient in vitamin D succumbed to an induced pneumococcic infection, whereas 50 per cent of the normal rats inoculated, resisted the infection, and eventually recovered.

Again, Grant, Bower and Stegermann,[7] experimenting with vitamin-deficient diets in pregnant rats, succeeded in infecting the offspring of mothers kept deficient in vitamin D during pregnancy with the tubercle bacillus, whereas normal rats are known to be quite resistant to this infection.

Human suceptibility—It has long been observed by pediatricians, that children with rickets, even of minor degree, are more than ordinarily subject to the common infections of childhood. The late Dr. Alfred S. Hess emphasized this point in a national radio address, under the auspices of the American Public Health Association, on September 27, 1933. He stated in part, "The most common nutritional disorder among infants in temperate zones is rickets . . . its chief danger is, that it lowers resistance to infection."

Mader and Eckhard, of the University Children's Clinic, Frankfort, Germany,[8] reported an investigation on more than 6,000 children, dealing with the relative incidence and fatality rates of 3 common infections of childhood, for the rachitic and non-rachitic groups. Whooping cough had an incidence of 46 per cent in the non-rachitic, and 54 per cent in rachitic children. The pneumonia incidence among the whooping cough cases was 29 per cent in the non-rachitic, and 37 per cent in the rachitic subjects, with equivalent fatality rates of about 46 per cent. In children with rachitic deformity of the chest, however, the pneumonia rate rose to 55 per cent, and the extremely high fatality rate of 81 per cent was recorded.

For measles, Mader and Eckhard report an approximately equivalent initial incidence in both rachitic and non-rachitic children, *viz.*, 50.6 per cent and 49.4 per cent, respectively, but the pneumonia incidence in the rachitic group was 34 per cent as against 24 per cent in the non-rachitic. Again, of those children having rachitic deformity of the chest, the rate of pneumonia was 58 per cent—more than twice as great—and of these, 75 per cent died—whereas the usual fatality from the pneumonia in measles was about 35 per cent.

Again, in diphtheria, Mader and Eckhard's comparison of the rachitic and non-rachitic cases developing bronchial stenosis, seems significant. Of the 454 non-rachitic cases of diphtheria included, but 15 per cent developed stenosis, whereas of 61 cases with rickets, 62 per cent, developed bronchial stenosis. The deaths for non-rachitic cases of diphtheria with stenosis were 35 per cent, and for the rachitic, 62 per cent, approximately twice as many. However, the small number of rachitic cases in this latter series leads us to regard the findings

as probably significant but not conclusive.

RELATIVE INCIDENCE OF RICKETS, COMPARED WITH THE COMMON INFECTIONS OF CHILDHOOD

For many years, there has been a lack of recognition of the extremely high incidence of rickets in the cities, compared with the other common ailments of childhood. Probably the reason for this lies in the different manner of reporting—rickets being commonly stated in percentages, based on specific surveys, and the infections being recorded in rates per 100,000 of population.

To appreciate the relative incidence of rickets and the infections, it is necessary to state them both in the same mathematical unit. Let us choose percentages for our comparison here.

Rickets in some degree, on the basis of recent surveys in American cities, is conceded to be present in at least 50 per cent of the urban child population under 2 years of age. As to the infections, the studies of S. D. Collins [9] on the incidence of the common communicable diseases are to be considered. The data of this study were compiled from personal histories of large groups of individuals at the given age groups, in various localities of the United States.

For the age group 1½ years, within which most of the rickets initially occurs, the following percentage incidences are given by Collins, for four of the common infections:

Measles	11.4%
Scarlet fever	.08%
Whooping cough	10.5%
Diphtheria	.6%

TABLE I

REPORTED CASES OF CERTAIN COMMUNICABLE DISEASES
CHILDREN UNDER TWO YEARS
1927–1934

Measles

Year	Under 1 Year	1 to 2 Years	Total	* Per Cent
1927	508	...	...	....
1928	97	302	810	1.62
1929	765	2,823	2,920	5.84
1930	54	156	921	1.84
1931	455	2,020	2,074	4.15
1932	207	1,364	1,819	3.64
1933	226	1,192	1,399	2.80
1934	...	1,158	1,384	2.77
Total			11,327	
Average				3.24

Scarlet Fever

Year	Under 1 Year	1 to 2 Years	Total	* Per Cent
1927	17	...	...	....
1928	20	407	424	0.85
1929	55	685	705	1.41
1930	141	675	730	1.46
1931	153	654	795	1.59
1932	29	508	661	1.32
1933	35	624	653	1.31
1934	...	612	647	1.29
Total			4,615	
Average				1.32

Whooping Cough

Year	Under 1 Year	1 to 2 Years	Total	* Per Cent
1927	548	...	...	....
1928	544	1,084	1,632	3.26
1929	366	808	1,352	2.70
1930	288	675	1,041	2.08
1931	472	1,100	1,388	2.78
1932	451	1,095	1,567	3.13
1933	234	555	1,006	2.01
1934	...	1,150	1,384	2.77
Total			9,370	
Average				2.68

Diphtheria

Year	Under 1 Year	1 to 2 Years	Total	* Per Cent
1927	65	...	...	....
1928	89	667	732	1.46
1929	84	674	763	1.53
1930	126	448	532	1.06
1931	70	359	485	0.97
1932	14	123	193	0.39
1933	2	14	28	0.06
1934	...	28	30	0.06
Total			2,763	
Average				0.79

* Estimated population 50,000 in each year up to 2 years or a total population of 350,000 for the 7 year period

Turning to another source of data on the prevalence of the infections, based on the reported cases in a large urban community, Table I, for Chicago, covering a 7 year period from 1927 to 1934, is of interest.

In Chicago, the average percentage incidences under 2 years, reported to the Board of Health for the four infections, were:

Measles	3.2%
Scarlet fever	1.3%
Whooping cough	2.7%
Diphtheria	.8%

The lower level of reported cases in Chicago, compared with Collins's data obtained by case histories, may be explainable on several grounds, such as unreported cases, a variable incidence in different localities, and the different time periods under investigation.

However, accepting for purposes of comparison the higher incidences reported by Collins, of which the maximum was 11.4 per cent for measles, it becomes obvious that the incidence of rickets is far higher than any of the common infections of childhood—at least in the cities. As such, it surely deserves the attention of the health officer, and especially in its contributory relation to the infections.

THE ANTI-RACHITIC AGENTS

What progress has been made with the several anti-rachitic agents recently advocated for the cure, prevention, and possible eradication of rickets? We must frankly admit that we do not know. One thing, however, is clear—that in sum total, the anti-rachitic agents are yielding definite results. The incidence of rickets is slowly but surely receding. Severe rickets is now seen only occasionally, even in the cities, and mild rickets, as an easily recognizable clinical entity, is also on the decline.

The latest of the generally applicable anti-rachitic agents is vitamin D milk, produced by three processes—irradiation, fortification, with a concentrate, and the feeding of irradiated yeast to cattle. Its potential usefulness toward solving the public health problem of rickets, cannot as yet be judged. However, Table II, based on the easily recognizable symptoms and marks of rickets in the preschool group of children in Chicago, examined routinely year by year in the infant welfare stations from 1926 to 1935, inclusive, shows a decided decrease in rickets. These figures cannot be regarded as representing the total incidence of rickets in the community, because of the cursory nature of the examinations and because the data include healed rickets, which does not in any sense indicate the initial incidence, since the

TABLE II

PRESCHOOL CHILDREN IN CHICAGO
SHOWING DEFINITE EVIDENCE OF CLINICAL RICKETS

		Rickets							
	Number of Persons	Mild		Moderate		Marked		Total	
Year	Examined	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
1926	1,069	89	8.3	92	8.6	4	0.4	185	17.3
1927	2,158	107	5.0	267	12.4	14	0.6	388	18.0
1928	1,669	126	7.5	211	12.6	16	1.0	353	21.1
1929	1,636	141	8.6	155	9.5	16	1.0	312	19.1
1930	1,958	145	7.4	106	5.4	53	2.7	304	15.5
1931	7,142	613	8.6	468	6.5	75	1.1	1,156	16.2
1932	3,165	402	12.7	168	5.3	7	0.2	577	18.2
1933	2,575	268	10.4	84	3.3	1	0.04	353	13.7
1934	2,363	170	7.2	90	3.8	3	0.1	263	11.1
1935	3,057	162	5.3	55	1.8	1	0.03	218	7.1

TABLE III

SALES OF VITAMIN D MILK COMPARED WITH TOTAL SALES OF MILK IN CHICAGO, FROM JUNE, 1934, TO JUNE, 1935

Fresh Milk	*Average Daily Sales per Month* Gallons	*Average Daily Sales per Month—Vitamin D Milk* Gallons	*Per Cent Vitamin D Milk*
June, 1934	321,154	17,750	5.5
Sept., 1934	319,588	19,674	6.1
Dec., 1934	297,803	16,059	5.4
March, 1935	296,814	20,477	6.9
June, 1935	293,765	17,681	6.0
Average daily sales for the 5 months	305,825	18,328	6.0
Estimated yearly sales	111,626,125	6,689,720	6.0
Evaporated Milk			
Estimated yearly consumption of evaporated milk	31,800,000	15,900,000	50.0
Total estimated yearly consumption of fresh and evaporated milk combined	143,426,125	22,589,720	15.7

milder forms heal without leaving any evidence.

The total amount of easily recognizable rickets found within the last year, in this preschool group of children, declined from 13.7 per cent in 1933 to 7.1 per cent in 1935. Mild rickets also dropped from 10.4 per cent in 1933 to 5.3 per cent in 1935, and moderate rickets from 3.5 per cent to 1.8 per cent. Severe clinical rickets apparently began to yield to earlier preventive measures, as far back as 1932, with an incidence of 0.2 per cent in the preschool children routinely examined. It is interesting to note that the item of severe rickets reached 0.03 in 1935.

Within the last year, the only anti-rachitic influence calculated to affect the child population generally in Chicago, is vitamin D milk (Table III), the sale of which was authorized by ordinance on April 24, 1934, and began immediately thereafter. The general sale of vitamin D evaporated milk in Chicago began at about the same time. Since then, the percentage of vitamin D fluid milk consumed in the city, as indicated by quarterly surveys, has remained constant at about 6 per cent of the total sales. In addition, there was consumed, according to the best estimates obtainable, about one-fourth to one-third as much evaporated milk, of which approximately 50 per cent was vitamin D milk. No other unusual factors likely to affect the prevalence of rickets were operative within the year, so far as we know.

SUMMARY

There has been tardy recognition of the relative public health importance of rickets among the common ailments of childhood.

Recent experimental evidence shows quite definitely that the public health importance of rickets lies principally in its contributory relation to the infections of childhood, such as measles, scarlet fever, whooping cough, and diphtheria.

Definite conclusions regarding the efficacy of the latest addition to the generally available anti-rachitic agents, vitamin D milk, are not yet possible. The time since its introduction is too short, and unfortunately the volume of fresh vitamin D milk consumed is still far too small to permit of satisfactory evaluation.

However, the combined consumption of fresh and evaporated vitamin D milk in Chicago, during the past year, amounting to about 25 per cent of the total sales of milk, when considered in

connection with the recently noted decrease in clinically-recognizable rickets among the preschool children, is sufficiently suggestive to justify more general trial of this fortified food product, as an anti-ricket reagent.

When the total sales of both fluid and evaporated vitamin D milk reach about 50 per cent of the total sales of each, the real test of the product as a general anti-rachitic agent, will have begun.

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Charles Kingsley on the Laws of Health

IT was in 1879 that Charles Kingsley had recognised that the best knowledge of the time concerned the new light on the laws of health. "I am going," he writes, "to throw myself into this movement. I am tired of most things in the world; of sanitary reform I shall never grow tired. No one can accuse a man of being sentimental over it, or of doing too much of it. There can be no mistake about the saving of lives, and the training up of a healthy generation." Again he says, "I see more and more that we shall work no deliverance till we teach people a little more physical knowledge. I have refused this winter to lecture on anything but the laws of health." Since Kingsley's days there have been many changes, but not one which has impaired the truth of his writings. Let us, therefore, aim at increased efforts toward securing an enlightenment of the people in regard to the health of the community, for in this way we find the true source of health and happiness. —James Fenton, M.D. Public Lecture to the South African Health Congress, *J. Roy. San. Inst.*, May, 1936, pp. 646–647.

Effect of Relief Programs on Public Health Nursing in the State*

Preparation of Nurses

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THERE has been a Bureau of Public Health Nursing in the Indiana State Health Department ever since 1921, but we in the bureau have never had authority over any of the public health nurses employed locally as such bureaus have in states which subsidize nurses' salaries. Our first aim was to raise the standard of preparation of nurses who wished to do community health work, so we kept advising them to get prepared, showing them how and where they could get this preparation, and we kept advising organizations, both official and unofficial, to employ nurses who met the minimum qualifications outlined by the National Organization for Public Health Nursing.

These organizations or officials chose the nurses they pleased if they did not care to take our advice. Nurses thus employed used our daily and monthly report forms and sent us monthly reports—if they liked. We never could get uniformity. We had just reached the point where perhaps half the health officers, school men, and lay boards were beginning to realize that the right nurses with the proper preparation in public health could run rings around nurses employed solely because they were home town girls, or personal friends, or belonged to the right political party. We always dreamed though of what we could accomplish if we only had a little authority so that nurses would have to accept our leadership.

Then the Civil Works (later the Emergency Relief) Administration Program opened up the opportunity, indeed, the necessity, for us to educate and guide a large group of nurses on public health assignments. We quailed at the thought of putting totally unprepared nurses to work in the rural areas and small towns without local qualified public health nursing supervision, but here, partially at least, was a chance to fulfil our dreams, for these nurses were totally dependent on us for salaries, education, and supervision, for 18 months. We did not have time to philosophize over the effect these nurses would have on our standards of public health nursing in the state; we had to get busy.

You who read the *American Journal of Nursing* [1] and *Public Health Nursing* [2] are familiar with the details of our educational program for Indiana ERA nurses. I shall confine myself in

* Read before the Public Health Nursing Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

this paper to the significant lessons this experience taught us in guiding our future state-wide educational program for public health nurses.

A little professional house-cleaning and refurbishing had to be done before we could begin to prepare the ERA nurses for their community work. For years we had been working with lay boards, especially those of the unofficial health agencies, with groups of teachers, with the social agencies, and with the health officers, to teach them good standards of public health nursing; but we had almost ignored physicians, both individually and collectively. Now, partly as the result of the depression and the *Report of the Committee on the Costs of Medical Care,* we had been hearing vague rumblings from some of the physicians against public health nurses. These new nurses, we decided, must be taught at the start the unwritten laws of public health nursing ethics as they related to the medical profession. Likewise, we had to have the approval and coöperation of the physicians. This double task loomed biggest of all ahead.

The progressive superintendent of schools in one of our most populous counties sent in the first call for nurses—he wanted 6 to do township school nursing in areas that had never had the services of community nurses before. It was here that the rumblings against public health nurses among the medical men had been loudest. The assistant director of our bureau was sent to this county with the tacit understanding that she was not to come back until standing orders for the 6 nurses had been obtained from the local medical society. She did her work well. She convinced the reluctant superintendent of schools that his nurses needed these orders; then she assisted the medical society in formulating them. When completed, they included general directions for children found ill in schools, contained a list of conditions usually requiring exclusion of children from school, outlined what nurses should look for in inspecting school children, listed articles to be carried in the nurse's bag, outlined a simple program for the nurses to carry out, explained first aid procedures the nurse could use and the nursing care she could give in emergencies.

A copy of these regulations [3] found its way to the State Medical Association, where it created a great deal of interest and met with approval. There, mimeographed copies were made and sent to the secretary of every county medical society as a suggestion in case emergency nurses were put on to work in his community. Many copies were furnished our bureau and no new nurse was put on who did not have a copy to be altered or approved by her local medical society.

I have enlarged on the development of these regulations and standing orders because, as we look back, we realize that they were the first measures we designed to educate these new nurses. If the nurses lived up to the regulations we would not need to worry about their professional ethics. We found, too, that endorsement of the regulations by the State Medical Association oiled the wheels for our whole future program, for through them physicians all over the state, especially those who had never worked with public health nurses before, began to realize that community nurses were not trying to supplant them. To show their changed attitude, last winter the legislative committee of the State Medical Association put a clause in the full-time health officer bill giving public health nurses in Indiana a legal status for the first time in history.

Advisory nurses working by districts in the field were the next major measure we launched to educate the nurses. No program would have lasted without

them. All of them had too many counties and new nurses, but they did heroic work. They not only had to assist new ERA nurses in getting started, but no service was begun in a new community until they had made a visit there, seen the prospective nurses, helped to select the official sponsor, and made their recommendations to our bureau.

The 37 one-day institutes our bureau conducted in different sections of the state were an important factor in making for the efficiency of our new community nurses, and they had far-reaching effects in stimulating general nursing education in the state. However, it was the district advisory nurses—who attended each institute and assisted in conducting the program, and then taught the nurses in the field how to apply what they had learned at institutes to fit their individual situations—who made the education really carry over. We must never forget this fact.

ERA nurses on well organized public health nursing staffs were required to attend the institutes, even though they had the benefit of local staff education facilities. They and their supervisors contributed a great deal to the technical discussions and demonstrations. Most of them were doing bedside nursing. They learned a great deal too, because they got an insight into the complicated problems of county nurses who worked in rural or isolated areas, and who often had no hospital or social agencies in their territories to help them.

We learned that our bulletin *Echoes*, which has always been enjoyed by our regular public health nurses, was a potent factor in educating and stimulating ERA nurses and giving them a group feeling and pride. In it we put proposed plans, new rules and policies, announcements of institutes and meetings, news notes, extracts from narrative reports, and other educational matter. ERA nurses all read *Echoes* and solemnly took to heart all the suggestions it gave.

We learned that nurses can be stimulated to make narrative as well as statistical reports, which give a real picture of situations and problems and how they are met that is invaluable to a central bureau striving to help them. Edna L. Foley, R.N., of the Chicago Visiting Nurses' Association wrote us commenting on the case stories from ERA nurses which she read in *Echoes:* "I always feel that a narrative report is so much more interesting than a statistical one, but it is 50 times harder to wring from the nurses." We agree, but we found it could be done.

We could see a gradual improvement in the effectiveness of the ERA nurses' services as time went on. Their questions and responses in institute discussions, the advisory nurses' reports of their services, the nurses' own case stories given in their monthly narrative reports, showed that they were learning how to teach and organize; and many of them showed an uncanny understanding and practice of the art of public health nursing.

The whole demonstration changed our views somewhat about the preparation of new nurses for their jobs. We had thought that it would be calamity if a nurse took a public health position without a theoretical course or well guided experience, or both. Now we know she can do fairly acceptable work if trained right on the job, provided she is responsible to a central bureau well enough trained and staffed to give her education and supervision. We had thought too that nurses did better when working in communities away from their homes. Working at home did not seem to handicap Indiana ERA nurses.

I said early in this paper that we always dreamed of what our bureau could accomplish if we had a little

authority behind our leadership of public health nursing in the state, but we never dreamed that the results of such an opportunity would have such far-reaching effects, for a by-product of our institutes for ERA nurses was the creation of a desire among all nurses to know more about public health. They lead to state university extension classes in Principles of Public Health Nursing and Social Work for Nurses, which approximately 75 ERA nurses took last winter in several centers in the state; 65 institutional nurses also attended, and around 90 regularly employed public health nurses. Other well attended extension courses for nurses are being given in 7 centers of the state this year. Credits received apply toward the B.S. degree with a major in public health nursing. Many of the ERA nurses who are being employed to continue their programs with local official and unofficial funds took university summer courses approved by the N.O.P.H.N., and are continuing with their extension classes this winter. They are not through. They have had a taste of education in public health; they see their needs and opportunities.

The institutes and extension classes and general ERA nursing program led to the adoption by the State Board of Education in June of higher regulations for school nurses which were formulated by a special committee of the State Nurses' Association to advise the director of the Licensing Bureau, State Department of Public Instruction. The State Bureau of Public Health Nursing collects the professional histories of all nurses applying for school nurses' licenses and assists the Licensing Division in deciding what nurses are eligible for permits or licenses. To the Bureau of Public Health Nursing also falls the placement and supervision in the field of all school nurses.

The whole ERA nursing program led too to the better regulations and higher requirements for public health nurses employed by county commissioners and city councils which were formulated by the State Board of Health in July and made the responsibility of our bureau to administer and enforce.

In the past the standard of training of public health nurses employed by the unofficial health agencies has been somewhat higher than that of the nurses employed by the official health agencies. Now, however, with the new regulations, all officially employed public health nurses will have much higher standards.

I said that the main thing we learned from our ERA educational program was that in an emergency nurses in a state-wide program in public health can be trained pretty well on the job if a central agency like the Bureau of Public Health Nursing of the State Health Department has the trained personnel and the authority to do it through institutes and adequate supervision, supplemented by extension classes and summer courses. However, we still feel that regularly employed public health nurses should have the N.O.P.H.N. Minimum Qualifications [4] before taking their positions, and our new regulations for officially employed public health nurses require this. Initial preparation for public health nurses, though, is not enough. They must be constantly learning. We feel that one of the greatest tasks of our bureau in the future should be the arrangement of a continuous educational program for refreshing and stimulating public health nurses already employed, especially those without local supervision. Now that our bureau has more authority over the officially employed nurses we can plan such a program.

A recent survey made among rural and small town nurses in New York, Minnesota, Ontario, and Indiana by

a public health nursing student in Teachers College, Columbia University, showed they would welcome more supervision of the right kind, and felt the need of more assistance than they had been getting in organization work, program planning, community relationships, family case work, publicity, and records.

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The Sanitary Code

IN 1842 a report was published on the sanitary conditions of the labouring population of Great Britain. It was an elaborate description of the shockingly insanitary conditions under which the masses of the people were living in every part of the kingdom. The report pointed out that the formation of habits of cleanliness was obstructed by defective water supplies; that the actual loss of life from diseases induced by dirt and bad ventilation was greater than in any wars which the country had been engaged upon in recent times; and that the effect of the conditions upon the population was to make them short-lived, improvident, reckless and intemperate.

The first medical officer of health in England was appointed in 1847 for the City of Liverpool. London followed a few months later. The first Public Health Act was adopted in 1848 at a time when an epidemic of cholera was ravaging the country. In 1860 we were in the midst of a severe epidemic of typhus fever, and cholera again appeared. Further Acts of Parliament were introduced to deal with urgent problems, and public health legislation multiplied until in 1875 all the sanitary laws were consolidated in the great Public Health Act of 1875, which is the greatest sanitary code ever enacted in England or any other country. That Act has been the basis of public health legislation introduced in many quarters of the world; it has stood the test of time and is still on the statute book.—James Fenton, M.D., Public Lecture to the South African Health Congress, *J. Roy. San. Inst.*, May, 1936, p. 641.

Diagnosis of Infectious Mononucleosis in Public Health Laboratories*

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IN 1885 Filatow[1] presented a somewhat meager description of a glandular disorder of humans which he considered to be a disease entity. Four years later an accurate detailed description of similar cases was made by Pfeiffer[2] who recognized the condition as an infectious process characterized by very definite symptoms to which he gave the name "glandular fever." Before the close of the century this disease had been reported from all important medical centers throughout the world, the first case histories in this country having been published by West in 1896.

Because of its benign nature, perhaps, little attention was devoted to glandular fever until about 1918–1920 when several persons who had what was diagnosed as hopeless acute lymphatic leukemia recovered wholly in from 1 to 2 weeks. This so stimulated interest in glandular conditions in general that within a few years considerable literature on the subject had accumulated. Unfortunately, because of variations in symptoms and lack of historical knowledge, several names have been assigned to the same or similar conditions. Of these, 3 are in common usage at the present time: glandular fever, monocytic angina, and infectious mononucleosis. The last term appeared first in a report by Sprunt and Evans[3] in 1920, and has been more generally accepted in this country than abroad where "glandular fever" is more commonly used. Attempts have been made to apply these terms to what some contend are quite different infectious processes, namely: glandular fever, characterized by marked glandular enlargement usually in children from 5 to 15 years old; monocytic angina occurring in the 10–25 age group, characterized by a membrane in the throat clinically indistinguishable in appearance from diphtheria; and infectious mononucleosis, the febrile type occurring in adults, characterized by temperatures of 102° to 104° and maculo-papular eruptions frequently indistinguishable from those of typhoid fever, or rubelliform eruptions indistinguishable from rubella. No strict line of demarcation, however, exists between these conditions since occasionally all symptoms may occur in a single individual, and it is generally conceded that the different syndromes are but different manifestations of one and the same disease. From the standpoint of priority then, glandular fever is the proper appellation for this condition but "infectious mononucleosis"

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* Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

appears to us to be a more descriptive term.

The epidemic nature of infectious mononucleosis with an incubation period of from 5 to 15 days seems clearly established by the extensive reports of Tidy[4] and many others. Sporadic cases for the most part are more severe than the epidemic form, but in other respects the two forms are not significantly different. The degree of infectivity is not great though on occasions all members of a group may contract the disease, particularly when the group exposed is composed of children. Contact infection seems to occur only in the early stages of the disease and direct contact or throat droplet infection is probably the mode of transmission. Isolation of cases until 1 week after the temperature has returned to normal has been recommended.

The incidence varies considerably. Widely distributed epidemics, notably the 1930 epidemic in England, and large numbers of sporadic cases have been reported abroad. The number and extent of epidemics and the number of sporadic cases * in the United States are not great but it is believed that as more and more attention is given to this disease by public health authorities more cases will be found with a possible decrease in the incidence of those diseases for which infectious mononucleosis is commonly mistaken.

Infectious mononucleosis is usually encountered in the benign form though on occasion complete prostration with marked dehydration has been noted. Fatal cases are rarely reported unless there have been complications. Recurrence of the infection after several weeks is not uncommon, and recurrence after months and even years has been known. This may be taken as evidence that a single attack of the disease does not confer immunity. It should be pointed out that marked debility may be noted in some cases for from 6 months to a year following the onset of the disease.

The causative factor in infectious mononucleosis is still an open question. *Listerella monocytogenes* isolated from rabbits by Murray[5] and *Bacterium monocytogenes* isolated from an apparent case of the disease in man by Nyfeld[6] both lack confirmation as the etiological factor. A protozoön, noted by Bland[7, 8] who was able to produce a rapid and fatal febrile condition in rabbits and monkeys by the injection of blood from positive human cases of the disease, appears to be a normal inhabitant of many animals. Other organisms which at one time or another have been proposed as the infective agent all lack confirmation.

Whatever the cause or the course of the disease it is obvious that the clinician is dealing with an infectious and contagious disease, the importance of which lies not so much in the severity of the infection as in the confusing nature of the clinical symptoms. As previously pointed out, infectious mononucleosis in certain stages of the disease may be readily confused with typhoid fever, diphtheria, rubella, lymphatic leukemia, and less important conditions. An accurate laboratory diagnosis not only permits prompt reassurance of the patient by the physician but may save the public health officer considerable time and energy.

The blood picture in infectious mononucleosis, which is characterized by a more or less marked decrease in the polynucleated cells, with an accompanying absolute increase in the mononucleated cells, many of which are decidedly abnormal forms, offers a more satisfactory method of diagnosis than

* Working with a small group of physicians in Providence and Hartford since 1933 we have encountered to date 62 clinically, cytologically and serologically positive cases of infectious mononucleosis.

any one symptom. Even here, however, in some cases a marked "shift to the left" in the polynucleated cells with the appearance of the more primitive forms may be suggestive of myelogenous leukemia. On the other hand, since the absolute lymphocyte count often reaches a high level with the appearance of immature forms, particularly bi-nucleated cells, the picture may on occasion be almost indistinguishable from lymphatic leukemia. In view of the variations in both the clinical and cytological pictures a specific serological test would be of great value in diagnosis.

Paul and Bunnell,[9] in 1932, proposed a serological diagnostic test based on the presence of sheep heterophile antibodies in the blood of the patient. The heterophile antibody concerned may be defined as an antibody reacting with an agent other than and phylogenetically unrelated to the specific antigen responsible for the production of the antibody in question. The presence of increased sheep heterophile antibodies in the blood in cases of infectious mononucleosis was rapidly confirmed by a number of independent investigators. Furthermore, it was demonstrated that such antibodies were not increased in those diseases to which infectious mononucleosis so often bears a close resemblance.

The test originally devised by Paul and Bunnell and slightly modified by Stuart, *et al.*[10] consists of adding 0.5 ml. of 1 per cent suspension of washed sheep cells to 0.5 ml. of serial dilutions of the patient's serum. The tubes are incubated at 37° C. for 2 to 4 hours and the degree of agglutination noted. In the routine diagnosis of infectious mononucleosis it is not advisable to incubate the tests over night in the icebox since, as pointed out by Stuart, Tallman, and Brintzenhoff,[11] many normal sera with little or no sheep cell titer at 37° C. may show a titer as high as 1:160 when tested at 5° C. With confirmatory clinical and cytological evidence, a titer ranging from 1–80 to 1–10,000 at 37° C. is with few exceptions a positive diagnosis of this disease.

The test as described is wholly satisfactory as a diagnostic or confirmatory diagnostic test in a large majority of infectious mononucleosis cases, yet conditions do exist under which a serum of moderately high or even very high titer may be erroneously reported positive. Sheep heterophile antibodies similar in character to those found in infectious mononucleosis had been previously demonstrated by Davidsohn[12] and many others in the blood of individuals after injections of native or therapeutic horse serum, particularly when serum sickness developed. Moreover, it was shown by Davidsohn,[13] that such antibodies might persist in the blood of a patient for a year or more after treatment with horse serum. Should the serum from such an individual be submitted for an infectious mononucleosis test at any time previous to the disappearance of the sheep heterophile antibodies associated with the serum sickness, the routine procedure described would be valueless.

In an attempt to differentiate between the sheep agglutinating antibodies resulting from these two pathological conditions, Stuart, Welch, Cunningham, and Burgess[14] found that the sheep antibodies in serum sickness were completely adsorbed by emulsions of guinea pig kidney whereas those of infectious mononucleosis were not. In certain cases of serum sickness a gland condition resembling infectious mononucleosis is observed, but the blood picture does not resemble that of infectious mononucleosis. Should an apparent infectious mononucleosis case with a history of serum treatment give a high sheep cell titer, 1 ml. of a 1:5 dilution of the serum is adsorbed with 0.25 ml. of a

finely ground and washed emulsion of guinea pig kidney (Stuart[15]) for 1 hour at 37° C. with frequent stirrings. The mixture is then centrifuged and the supernatant fluid tested in serial dilutions for the presence of sheep cell agglutinins. If the sheep agglutinins are completely or almost completely removed by adsorption with guinea pig kidney, heterophile antibodies of the infectious mononucleosis type are not present. On the other hand, if the original sheep cell titer of the serum is not significantly reduced by the adsorption, the heterophile agglutinins of infectious mononucleosis are present.

Normal human serum possesses sheep heterophile agglutinins and, since the height to which the normal titer may rise has not been satisfactorily determined, it is sometimes difficult to tell whether one is dealing with a high titering normal serum or a low titering mild case of infectious mononucleosis, or a low titer from the early stages of an acute case of the disease. An accurate diagnosis is possible even under such conditions. Bailey and Raffell,[16] and working independently, Stuart, Fulton, Ash, and Gregory[17] noted that the heterophile antibodies of infectious mononucleosis were adsorbed by beef cells, and the latter investigators found that the sheep heterophile antibodies of normal sera were not removed by beef cells. One ml. of a 1:5 dilution of such a questionable serum is adsorbed with 0.25 ml. of washed packed beef cells as previously described for guinea pig kidney. The complete removal or the adsorption of a significant part of the sheep cell agglutinins is indicative of infectious mononucleosis.

The routine test for sheep agglutinins, confirmed if necessary by adsorption with guinea pig kidney or beef cells, will give an accurate confirmatory diagnostic test for infectious mononucleosis. It should be emphasized that the simple routine test is quite adequate for the great majority of cases and its simplicity will make it possible for practically all public health laboratories and most hospitals to carry it out routinely with their present equipment. The special adsorption tests are necessary on occasions and have been employed to excellent advantage in the laboratories of the Charles V. Chapin Hospital and the Rhode Island Hospital in Providence, and in the Bureau of Laboratories of the Connecticut State Department of Health in Hartford. We feel that the laboratory diagnosis of infectious mononucleosis will become increasingly important as a public health procedure as more cases are recognized through the use of a simple but accurate serological test.

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Tabulating Machinery for Indexing and General Tabulation in the Vital Statistics Office*

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TO most registrars in public health departments the adequate indexing of birth and death certificates is an irksome and prosaic task, falling into the category of "necessary evils." But it cannot be emphasized too often that records speedily recorded, accurately kept, and quickly available, are the very foundation of an efficiently conducted health department. As the city, state, and federal governments increase their demand for vital statistics as necessitated, for example, by the social security legislation passed by the last Congress, records become more and more important. Therefore, accurately kept, speedily recorded, and quickly available records, are the matters we propose to discuss.

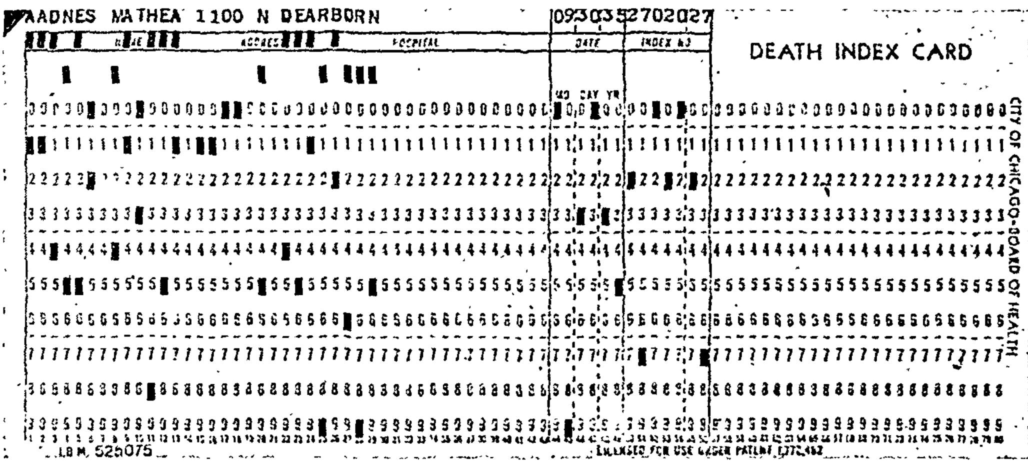
To provide a proper background for an appreciation of the new method of recording to be outlined in this paper, the usual handling of certificates, which has not changed materially for several decades, is worthy of summarization. While the details of the old procedure vary from place to place, the major steps are ordinarily somewhat as follows:

1. The incoming certificates are checked for accuracy and the certificates numbered.
2. Items on the certificates which are to be used as the basis for statistical tables are coded and, in most cases, tabulating cards are punched from this coded information.
3. Concurrently with many of these operations, there are usually prepared statistical tables of various types such as, in a city health department, a list of deaths or a daily analysis of general as well as infant mortality.
4. In most cases, index cards giving, in addition to the above information, some other identifying data such as residence, mother's maiden name, etc., are prepared.
5. Cities or states that maintain printed indices must, at the end of the year, make a copy of all the names in their files either by typewriting them or by spreading out the index cards and photographing them.
6. This copy is then given to the printer who, in turn, must set the information in type, proof-read it, and then return it to the health department to be checked as to its accuracy.

Due to the difficult composition, printing of matter of this sort is a lengthy task, as well as a costly one. Of course, while the index is being set in type—usually consuming a month or more—the index cards are not

* Read before the Vital Statistics Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 9, 1935.

FIGURE I—Index Card Made With Alphabetic Printing Punch



readily available for use in the office.

Where the old card system of indexing is used, card files soon become very voluminous, to the detriment of the working arrangement of the whole department. The element of human error is greater as the number of index cards in the file increases and, in the larger offices, a vast amount of valuable floor space must be set aside for filing cabinets.

The purpose of this paper is to describe a method which seems to overcome the shortcomings of the hand method and which can be installed without any appreciable amount of capital expense—a very vital factor in these days of meager appropriations and reduced budgets, coupled with the increased demands made upon the registrar's time and facilities.

It seems hardly necessary to elaborate on the punched card method as such. Tabulating machines employing the punched card principle have been used in health departments for almost 50 years, and most persons who received their training in public health work have some degree of familiarity with their operation.

The use of the alphabetic printing machines plays a prominent part in the subsequent description of the new indexing method. Based upon this new development in punched card equipment, the following procedure has been evolved which, with the necessary variations, can be applied to every indexing task:

1. Incoming certificates are checked for accuracy as heretofore. Inaccurate or incomplete certificates are, of course, held for correction or further information.

2. The correct certificates then go directly to the clerks who code and verify them in the usual manner.

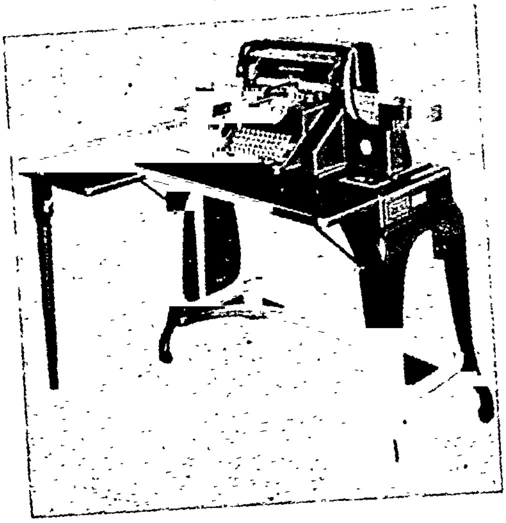
3. Next, tabulating cards are punched for statistical purposes. An index card is now made on a machine which punches and simultaneously typewrites across the top of the card the same information shown in the punched card (see Figure I). This double process of punching and typing is made possible by the development of a new type of machine, called the duplicating printing punch, which combines the punching mechanisms with a standard typewriter keyboard and type (Figure II).

4. The accuracy of the punching is verified by the use of the key punch verifying machine. The cards are then filed by hand, daily, in an alphabetical file.

5. At the end of the year the cards are removed from the file and sorted into strict alphabetic sequence by the electric sorter at the rate of 12,000 cards per hour, thus assuring a strictly accurate list down to the last letter of the name.

6. The cards are then run through the alphabetical printing machine which, at the speed of 80 cards per minute, prints the en-

FIGURE II—Alphabetic Printing Punch



tire information contained on the card—that is, the name, address, date of birth or death, and certificate number—across the width of the paper with one imprint of the machine (Figure III). This printing machine has 88 type bars, 45 of which are capable of printing numeric information only, while 43 can print both numeric and alphabetical information. The type bars in this latter section have 36 characters, 26 for the letters of the alphabet and 10 for the numbers from 0 to 9. This arrangement assures great flexibility and absolute accuracy in the reproduction of names and addresses.

By operating the machine for 10 hours a day, it is obvious that a file involving several hundred thousand names can be completely listed in a very short time. By utilizing paper of the proper size, it is possible to prepare the book indices directly from these sheets by the photo-offset or planograph process. However, if desired, planographing can be dispensed with, as the tabulating machine can produce, by means of inter-leaved one-time carbons, as many as 7 or 8 copies with perfect legibility. Still another possibility is the use of a mimeographed stencil in lieu of paper in the printing mechanism of the tabulating machine. From this stencil, as many additional copies as are needed can be prepared inexpensively. Again, the use of a hectograph ribbon in the tabulating machine enables additional copies to be made on any gelatin duplicators.

By keeping the cards for a number of years it is, of course, entirely feasible to make a cumulative alphabetical index covering 2, 5, or even 10 years, thus enormously reducing the amount of file space and searching time required.

The flexibility of the punched card method makes it practical to have the entire indexing for the state carried on at one central location. Local registrars who would normally file and index their own certificates can now send such certificates direct to state headquarters and within 2 days receive punched and printed tabulating cards already sorted, which they can insert into their own files. At the end of the year, state headquarters, from a duplicate set in its possession, can give the city a printed index, upon receipt of which the detail cards may be destroyed. In states with many medium sized cities, which now maintain separate indexing files, the saving in time and money should be very great.

So far, our discussion has dealt with the use of modern alphabetical tabulating equipment in indexing. However, the same machines that do the indexing job so efficiently can also be of tremendous help in the preparation of statistical tables of all kinds. Tables showing a distribution of causes of death by age groups, sex, and color can easily be prepared. On the basis of punched card equipment now available in many public health departments, such a report requires anywhere from 7 or 8, to 20 separate runs through the card counting sorting machine. In every instance, the figures on the dials have to be read off and transcribed to a summary sheet. The transcription process is fraught with possibilities of error. The summary sheet, in turn,

must be given to the printer for typesetting and the proof must then be checked against the original—two more possibilities for error. The cost of typesetting statistical tables of this kind is high because linotype machines are not practical in this work. Finally, the time consumed is so great that in many instances there is a lapse of several years between the close of the period covered by the report and its actual publication.

Due to the fact that alphabetic listing machines, such as are used in the work previously described, can be furnished with 80 adding counters and with devices which permit the grouping of the data in almost any desired arrangement, running the punch cards through the machine will produce the printed forms in shape for immediate reproduction by photo-offset printing or planographing. As one of the sets of cards is usually maintained in "cause of death" order, no sorting will be necessary at all in such a case, and printed reports could be available in a matter of weeks rather than months or years. Again, by utilizing a mimeograph stencil in lieu of paper in the tabulating machine and by drawing in the dividing lines by means of a stylus, thousands of copies of a table may be made rapidly and very inexpensively.

As to the cost, it may be interesting to know that on the basis of studies made in several cities, notably New York and Chicago, the statement can be made with a reasonable degree of accuracy that photo-offset reproduction or planographing directly from reports prepared by the tabulating machines costs just about one-quarter as much as having the same reports set up in type and printed. This saving does not take into consideration the time required for having the health department check the printer's proof.

To sum up: we have attempted to show in this paper that, by the use of modern alphabetical tabulating equipment, the cost of indexing may be greatly reduced, and accuracy and efficiency of the office increased. We

FIGURE III—Section of a Death Index for a City Printed Directly from Punched Cards

ABLIN NELL WALKER 2757 PINE GROVE		11	18	34	33535	27
ABNEY BENJAMIN 4537 WABASH		10	12	34	28644	27
ABNEY WALTER 2533 LOWELL		7	25	34	20755	27
ABRAHAM CHARLES 827 SUNNYSIDE		7	1	34	18524	27
ABRAHAM EMIL 944 NEWTON		3	30	34	9243	27
ABRAHAM GOLDIE 1301 S KILDARE		12	15	34	34106	27
ABRAHAM JOHN 1743 KEENON		4	19	34	11458	27
ABRAHAMS CHILD OF HATTIE 215 E 58	SB	3	6	34	384	26
ABRAHAMS ABRAHAM 1745 E 55		2	4	34	3539	27
ABRAHAMS MORRIS 3815 WILTON		6	22	34	17635	27
ABRAHAMS RACHEL WAUKEGAN ILL	OT	2	15	34	546	26
ABRAHAMSEN KATE 5220 RACE		4	29	34	12432	27
ABRAHAMSON AMELIA 1720 SUMMERDALE		1	7	34	540	27
ABRAMOVICH PETER 6146 W 61		7	7	34	19356	27
ABRAMOVITZ JACOB 918 MAXWELL		12	28	34	35482	27
ABRAMOWICZ STANLEY 2345 N LOCKWOOD		9	7	34	25014	27
ABRAMOWICZ TEKLA 8604 ESCANABA		3	2	34	6126	27
ABRAMS FANNIE 906 GLENCYLE		12	5	34	33101	27
ABRAMS FAY 6420 WAYNE		2	28	34	5846	27
ABRAMS HASKELL 8827 MUSKEGON		6	16	34	17013	27
ABRAMS IKE 1334 HYDE PARK BLVD		11	24	34	32111	27
ABRAMS MOLLIE 1321 S KILDARE		5	19	34	14273	27
ABRAMS PAUL 5483 GREENWOOD		5	1	34	12469	27
ABRAMS ROBERT 5612 INGLESIDE		9	26	34	26755	27
ABRAMS SAM 2527 THOMAS		1	23	34	2225	27
ABRHAM ANNA 3819 W 55 PL		10	21	34	28841	27
ABROMAITIS STELLA 3432 LOWE		1	15	34	1338	27
ABT LOUIS 4109 W MONROE		4	14	34	10777	27
ACACIO BERNICE G KANSAS CITY MO	OT	5	1	34	1452	26
ACCADIO LEONARD 6613 OCONTO		10	22	34	29018	27
ACCARDO VENCENZO 1004 S CYPRESS		11	3	34	30032	27
ACCETTURA GAETANA HUNTINGTON PK CALIF	OT	11	23	34	3531	26
ACCORSI INFANT 2144 N 74TH CT ELMWOOD PK		10	17	34	28675	27
ACHESON ERMA 2515 W ADAMS		10	2	34	26317	27
ACHTEN CHARLES 439 N HAMILTON		3	16	34	7765	27
ACHTERBERG CHARLES OAK PARK	OT	6	2	34	1772	26
ACKELS ANNA 10616 S HOYNE		9	20	34	26087	27

believe that the machines that make this possible need not be confined to indexing, but that they may be applied with equally salutary results to the preparation of all manner of statistical tables and tabulations.

It should be noted that the size of the health department is not necessarily a factor in determining the applicability of the punched card method. Of late, tabulating service bureaus have been established in principal cities throughout the world, so that a department would need only a punch and a sorting machine of its own, delegating the task of preparing the printed index itself to such service bureaus. In this way, the fixed expense can be held down to a minimum without sacrificing any of the benefits of this method.

Twins

ONE out of every 100 women about to have a baby in New York City, will surprise her husband by presenting him with twins. One out of every 20,000 expectant fathers will be overcome by having to care for three new arrivals. Neither the expectant mother nor father, however, need have much fear of having to provide for quadruplets, for in the recent history of the Department of Health there have been only two sets of quads. These were born in the Bronx in 1934 and all died.

These facts were disclosed May 30 by a survey just completed by the Bureau of Records of the Health Department, New York, N. Y., covering the 14 year period, 1922 to 1935, inclusive. One of the tables is shown here.

Period	*Births, Yearly Average*	*Twin-sets, Yearly Average*
1922–1926	128,717	972
1927–1931	123,611	1,092
1932–1935	103,818	871

From this it may be seen that while births have shown an average yearly decrease of approximately 25,000 between the 1922–1926 and the 1932–1935 periods, the decrease in twins has only been an average of 101 sets a year. Twins, however, have been following the downward trend of births year by year, and this is particularly noticeable from 1928 to the close of last year. In 1928 there were 1,212 sets of twins born, while in the 3 following years, 1929, 1930, and 1931, the average was only slightly over 1,000 sets a year. Since then the 1,000 mark has not again been reached.—New York Dept. of Health Release, May 31, 1936.

Effect of the ERA Nursing Service on Volunteer and Official Agencies*

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FORTUNATELY the State Board of Health has had the full control of the ERA Nursing Service. This has prevented duplication of work. One can readily see the possibility of friction and the lack of coöperation if it had not been under proper supervision.

Due to lack of funds for the past 3 years, the Division of Public Health Nursing has not been conducting a generalized program and supervising the nurses employed by volunteer agencies and by cities and counties; therefore, has not received monthly reports from these nurses employed by the local organizations. Prior to the establishment of the ERA Nursing Service the list of those employed in the state was incorrect and incomplete. A survey was made to determine the number of organizations employing nurses. As a result of this survey, it was found that a total of 91 nurses were employed in the state by:

- 4 Red Cross
- 1 U. S. Naval Air Service
- 5 Full-time in County Health Departments
- 7 Metropolitan
- 4 Crippled Children's Commission, financed by the American Legion
- 2 Junior League and Kiwanis Club
- 1 Tuberculosis Association
- 59 Cities, counties, and school boards
- 1 Gulf Life Insurance Company
- 7 Industrial

It is a pleasure to speak of the relationship between the state ERA Nursing Service and the city, county, and volunteer organizations. In Florida we have so few full-time health departments and so few one nurse services, it hardly seems fair for us to compare the ERA Nursing Service with that of other states where the ERA nurses can work under the supervision of a trained health officer. Furthermore, time has not allowed us to judge the effect of the ERA Nursing Program on the permanent services. Because of our knowledge of the work in the state there has been no overlapping or interference in any way with the volunteer or official agencies, but the ERA has filled a definite need which for lack of funds or perhaps because sufficient influence had not been brought to bear on appropriating officials, had not been met by the permanent services.

If under the proper supervision, there is no reason for any organization to look at the ERA Nursing Service with fear and trembling—wondering how it will function and whether it will disrupt and antagonize the agencies with which the lone nurse as well as the units have established satisfactory relations.

Recently when the program had to be cut, it was interesting to note the requests from the various counties pleading for their nurse to remain. Again, when the program had to be changed from FERA to WPA, several of the counties appropriated funds or transportation so that the project could be passed. In the counties where there

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is no permanent organization the ERA Nursing Service had developed a health consciousness and assisted in promoting health units, which we hope will materialize when Security Funds are available.

Where advisable, nurses were assigned to health departments, but were visited weekly by the District Supervisor of Nurses, who was well trained in public health, so that the State Board of Health would be in constant touch with the work. The nursing services in 2 of the large city health departments were utilized to give training and experience to the ERA nurses. After this training each nurse was placed by herself in a district dividing the territory with the nurse previously employed by local agencies. In a community where a public health nurse was already employed and it was not practical to divide the territory, the ERA nurse confined her activities entirely to ERA clients carrying on a generalized public health nursing service with the family. With 3 organizations in Duval County—City Health Department, Metropolitan Life Insurance Company, and Gulf Life Insurance Company—all employing nurses, one can readily see the duplication if a plan had not been worked out and frequent conferences held with the supervisors of each service.

Monthly meetings were held with all public health nurses, and while their primary purpose was to discuss articles in various professional magazines and the newer methods in public health, they gave all an opportunity of becoming acquainted, which made for a better understanding of the work.

During the past few years the public health nurses have for the most part confined their efforts to school work, to the neglect of the prenatal, infant, preschool, and classes in home hygiene and care of the sick. Where we found this to be the case, the ERA nurse carried on a more intensive maternity program, and conducted home hygiene classes. The classes have been or will be conducted in practically every county in the state, affording a means of teaching the parents the care of the sick in the home and how to meet simple emergencies, thus decreasing the number of necessary home calls for the nurses.

Not until this service was developed, did the public health department give any bedside nursing, which even now is given for the purpose of demonstration only.

There was no Visiting Nurse Association in the state. For the most part practising physicians and health officers were unfamiliar with this type of work, and the health department did not consider it part of its program, but with the sympathetic understanding of our state health officer toward the nursing service, we were able to give the public a service never before rendered in Florida. As a result, one permanent Visiting Nurse Association has been organized and is ready to function when ERA is discontinued.

To build for the permanency of the nursing program, public health nursing councils of lay people have been organized. In counties where there was an active Red Cross committee or tuberculosis committee, having no special project, they were asked to sponsor the nursing service. In many instances this has been carried out and developed a stronger organization than had existed in the past. The Loan Closets, which have been established in the majority of the counties, have been developed by these public health councils, and articles have been supplied by various organizations. The community has found that this fills a great need among the poor patients and is a source of satisfaction. Where public health councils had been established prior to the ERA service, we have asked if the

nurses could attend the monthly meetings and submit reports just as the permanent nurses did. This was done for 2 reasons—so the people in the community could see there was no duplication of work and so the permanent nurse could hear the report of the ERA nurses, at which time a conference would be held in regard to the work of both services. They have proved very helpful both to the ERA and permanent nurses and have enhanced the value of their work.

Few medical advisory committees had been organized in the state, probably due to the fact that the doctors had taken for granted the work of the nurses, and the nurses had failed to ask for the appointment of advisory committees; but because the majority of the ERA nurses were unfamiliar with public health nursing and a certain amount of bedside nursing would be given, the presidents of the local medical societies were requested to appoint these committees and approve standing orders, which were drafted somewhat after those of the N.O.P.H.N., but modified to suit the local situation.

Monthly small district institutes were held by the district supervisors for the purpose of familiarizing the ERA nurses with the work. The permanent nurses contributed to the institute programs giving demonstrations and discussing various phases of public health nursing. Larger district institutes were conducted by representatives from national organizations which both permanent and ERA nurses attended.

Our main object was to coöperate with all existing agencies and serve the people to the best of our ability. Several separate nursing projects were proposed, but fortunately, through our state health officer, they were directed along the proper lines and kept under the supervision of the State Board of Health. The ERA Nursing Service under the State Board of Health has served well the purpose for which it was established, namely, to give employment to nurses in need, and give bedside nursing to relief clients; furthermore, it has supplemented in a large way the public health nursing programs of the State Board of Health and other agencies.

Without additional personnel, the permanent organizations would have been unable to give proper nursing supervision to the many ERA projects that were promoted, such as nursery schools, canning factories, mattress factories, etc., all of which needed public health attention.

Because of their previous training and experience the regular staff nurses were made supervisors and it became their duty to instruct the ERA nurses in the proper procedure of conducting a generalized program, which included the supervision of midwives.

We should look upon all public health nurses, both permanent and ERA, as members of one happy family, all working toward the same goal.

Tuberculosis Studies in Tennessee*

A Clinic Study With Reference to Epidemiology Within the Family

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PAPERS have appeared from the Tennessee Department of Public Health which bear the general title, "Tuberculosis Studies in Tennessee."[1] This is another of the same series and deals with certain findings in the study of a group of white individuals forming a number of household groups in Williamson County, Tenn.

Williamson County had a population of 22,845 according to the Federal Census of 1930. Of this number about 23 per cent were Negroes. The county is usually considered representative of the rural part of the section known as Middle Tennessee. It has 1 incorporated town, Franklin, which had a population of 3,377 in 1930.

The chief source of income is agriculture, as there are no large industrial concerns in the county. An active and efficient full-time county health department has been in operation since 1921. The intensive study of tuberculosis was begun shortly before 1932, and was made possible through the coöperation of the International Health Division of the Rockefeller Foundation. During the preceding 12 years the number of deaths reported as due to tuberculosis averaged 29 per year, an average annual tuberculosis death rate of 123 per 100,000 population. This rate does not differ materially from that of the state as a whole, and the same trends downward have been seen in Williamson County and in the State of Tennessee.

The group engaged in the study of tuberculosis in the county has endeavored to locate as many cases as possible, and to examine those individuals who are or have been in close association with the cases found. The follow-up activities have been a matter of much importance, and an ever-growing one with the finding of additional new cases with the progress of the study. One of the objectives has been to assemble material which might be useful in planning and conducting programs for the control of tuberculosis in other rural areas.

There are 150 households included in the material used in the present study. Each has or has had in residence a person known, or suspected, to have some form of pulmonary tuberculosis of the adult type. Each of these individuals is the "index case" in the household in which he is recorded. The "index case," as used here, designates that person through whom attention was drawn to the household, and may not

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be the only case in the household, or the initial case in the household in point of time. The index case may not be tuberculous, having been examined because of suspected tuberculosis and found to be negative, so far as any demonstrable pulmonary lesion of the adult type is concerned. Although the numbers involved are small, they are statistically significant.

The index cases furnish a group which may be considered a cross-section of those found in carrying on a case-finding program based on obtaining information concerning known or suspected cases of tuberculosis. Such a program is in effect in many parts of the country at present. A matter of particular interest is the result of examination of household contacts of various types of index cases in order to determine which are: (1) infected with the tubercle bacillus, and (2) additional cases of tuberculosis.

The index cases are classified in 4 types:

1. Fatal plus sputum positive—In this group are included those which resulted fatally before the observation of the household, and those which were found to have positive sputum within 1 month of the initial clinic examination.
2. Manifest tuberculosis, sputum negative, or unknown—Those with clinical symptoms and X-ray findings which do not have the appearance of being in an arrested stage, sputum examinations negative, or no sputum available at the time of initial clinic examination.
3. Manifest tuberculosis, arrested—Those with no clinical symptoms suggestive of activity at the time of examination, and with X-ray findings having the appearance of being in an arrested stage.
4. Negative—Those which have no evidence on physical or X-ray examination of any pulmonary tuberculosis of the adult type.

The 150 index cases referred to fall into this classification as shown in Table I. A few in the series have been omitted. Index cases with latent apical tuberculosis and the households in which their records appear were omitted because the numbers were too small to be of statistical significance; those classed as suspicious have been excluded as the diagnosis was regarded as incomplete.

Table I shows the numbers of households in which the various types of index cases were found, the numbers of other members of these households and the numbers of these other members of the households which were examined, and the average number of members of the households.

It is seen that the percentage examined varies somewhat with the severity of the type of index case. It appears that it is possible to examine a larger percentage of the contacts of the more severe types than of contacts with one which has been found negative. This would be expected, but there has been no conscious difference in the effort made to secure the examinations.

TABLE I

CLASSIFICATION OF INDEX CASES, WITH MEMBERS AND EXAMINED MEMBERS OF HOUSEHOLDS

Type of Index Case	*Number of Households*	*Members of Households (Excluding Index Cases)*	*Members Examined*		*Average Number of Members of Households*
			No.	*Per Cent of Members*	
Fatal plus sputum pos.	34	148	127	86	5.4
Mfst., sputum neg. or unk.	34	143	118	83	5.2
Mfst., arrested	34	138	96	70	5.1
Negative	48	243	154	63	6.1
Total	150	672	495	74	5.5

TABLE II

RESULTS OF TUBERCULIN TESTING OF HOUSEHOLD CONTACTS BY TYPE OF INDEX CASE, AND DOSAGE OF TUBERCULIN

Tuberculin Reaction	*Fatal Plus Sputum Pos.*		*Mfst., Sputum Neg. or Unk.*		*Manifest Arrested*		*Negative*	
	No.	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*
Pos. to 0.01 mg.	84	80	56	53	26	39	49	37
Pos. to 1.0 mg.	6	6	23	22	19	28	26	19
Neg. to 1.0 mg.	15	14	27	25	22	33	59	44
Total	105	100	106	100	67	100	134	100

The average number of individuals comprising the household of a negative case is somewhat larger than in the other groups.

Table II shows the results of tuberculin testing of individuals in household contact with 4 types of index cases, arranged according to the dosage of tuberculin necessary to produce a reaction. Two dosages were used, 0.01 mg. and 1.0 mg. of old tuberculin, the larger dosage being used only after the smaller had not produced a reaction. The tuberculin was of a lot standardized by the method of Aronson and his coworkers of the Phipps Institute for the Study, Treatment, and Prevention of Tuberculosis.

It can be seen that the percentage of positive reactors decreases with the decrease in severity of contact as indicated by the type of index case in the household; also that the percentage of positive reactors to 0.01 mg. of tuberculin decreases in a like manner. This would indicate that a state of allergy exists in a greater proportion of contacts with the more severe type of index case, and that smaller dosages of tuberculin are necessary to show that this state of allergy exists.

Table III shows the age distribution of individuals tuberculin tested in household contacts of index cases.

It may be seen that 70 per cent of these household contacts reacted to

TABLE III

AGE DISTRIBUTION OF INDIVIDUALS TUBERCULIN TESTED IN HOUSEHOLD CONTACT WITH INDEX CASES

Age Group Years	*Total*	*Tuberculin Positive*						*Tuberculin Negative*	
		0.01 Mg.		*1.0 Mg.*		*0.01 Mg. or 1.0 Mg.*		*1.0 Mg.*	
		No.	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*
0– 4	57	24	42	1	2	25	44	32	56
5– 9	78	23	29	16	21	39	50	39	50
10–14	76	29	38	18	24	47	62	29	38
15–19	61	31	51	19	31	50	82	11	18
20–24	26	19	73	4	15	23	88	3	12
25–34	33	27	82	4	12	31	94	2	6
35–44	36	25	69	6	17	31	86	5	14
45–54	20	17	85	3	15	20	100	..	..
55–64	17	15	88	2	12	17	100	..	..
65 +	8	5	62	1	13	6	75	2	25
Total	412	215	52	74	18	289	70	123	30

tuberculin in dosages of 1.0 mg. or less. Of the 412, 52 per cent reacted to 0.01 mg. An additional 18 per cent reacted when 1.0 mg. was used. The percentage of positive reactors to the 2 dosages after early life is approximately parallel, *i.e.*, the use of the larger dosage of tuberculin produces about the same percentage of reactors among those negative to the smaller doses in each age group after the 15–19 year group. In the age group under 5 years, practically all the reactions were to 0.01 mg. In the 35–44 year age group there is a drop in the percentage of positive reactors, which is probably of no significance. In persons 65 and over, there is a greater drop in the percentage of positive reactors, but this group is too small to be of significance. The index cases are not included in this tabulation.

It is quite apparent that there must be differing degrees of exposure within the household, and also varying possibilities of contact with tuberculous individuals outside the household. If individuals under 25 years of age are considered, and divided into 3 age groups, under 5, 5 to 14, and 15 to 24, it would seem reasonable to assume that in the younger age groups, household contact would be of more importance. Using these 3 age groups and the 4 types of index cases, with the result of tuberculin testing as an indicator of infection, Table IV was prepared.

It is seen that the percentage of household contacts under 25 years of age showing positive tuberculin reactions decreases with decreasing severity of the type of index case. These percentages positive are 79, 67, 61, and 47. The gradation downward is most marked in the age group under 5 years, individuals of which have a more circumscribed sphere of activity, largely limited to their own particular households. It is also reasonable to assume that if a severe type of index case exists in the household, the children under 5 years are in more intimate association with it than those in the next age group, 5 to 14 years. In Table IV it is seen that a lower percentage with positive tuberculin reactions is found in the 5 to 14 year age groups (roughly, the school age) than in the infant and preschool age group, under 5 years of age in the fatal plus sputum positive households. This difference is not statistically significant, as only a small number of individuals are included.

The results of clinical and X-ray examination of these household contacts differ from those shown by the tuberculin reaction. It is known that it may require a relatively long period before tuberculous infection can be demonstrated by an X-ray film of the

TABLE IV

TUBERCULIN REACTORS IN HOUSEHOLD CONTACTS OF 4 TYPES OF INDEX CASE IN 3 AGE GROUPS UNDER 25 YEARS OF AGE

Age Groups Years	*Fatal Plus Sputum Positive*			*Manifest Sputum Negative or Unknown*			*Manifest, Arrested*			*Negative*		
	Total	*Pos.*	*Per Cent*	*Total*	*Pos.*	*Per Cent*	*Total*	*Pos.*	*Per Cent*	*Total*	*Pos.*	*Per Cent*
Under 5	13	11	85	15	7	47	6	2	33	23	5	22
5–14	35	25	71	36	22	61	24	13	54	59	26	44
15–24	19	17	89	30	25	83	19	15	79	19	16	84
Under 25	67	53	79	81	54	67	49	30	61	101	47	47

TABLE V

CLINICAL AND X-RAY FINDINGS IN HOUSEHOLD CONTACTS BY TYPE OF INDEX CASE AND TYPE OF LESION

	Fatal Plus Sputum Pos.		*Mfst., Sputum Neg. or Unk.*		*Manifest, Arrested*		*Negative*	
Type of Lesion	*No.*	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*
Manifest tuberculosis	7	6	2	2	3	3	1	1
Manifest tuberculosis arrested	6	5	1	1	3	3	3	2
Latent apical tuberculosis	8	7	7	6	5	5	4	3
Latent infiltration and/or caseous lymph nodes, childhood type	10	8	6	5	..	..	2	2
Calcified nodules and/or tracheo-bronchial calcification	45	38	33	30	36	40	49	37
Negative	44	37	62	56	44	48	72	55
Total	120	101	111	100	91	99	131	100

chest; whereas, the tuberculin test is positive within a short time after infection. After the appearance of lesions demonstrable by X-ray films, they, for the most part, remain visible, while allergy may be lost over a time if the lesion has healed and reinfection has not taken place. Table V shows the findings on roentgenological examination of individuals in household contact with 4 types of index cases, arranged so that the cases of manifest tuberculosis are separated from the others.

The percentage of contacts showing evidence of manifest or latent apical tuberculosis is highest in the contacts of the most severe type of index case, and lowest in the contacts of those classed as negative, and the same is true when consideration is given to the more severe forms of childhood type of tuberculosis. All ages are considered here with no distinction as to younger age groups in which it might be reasonable to suppose that household contact would be of more importance than in the older age groups.

The age distribution of individuals with clinical and X-ray findings are shown in Table VI. These individuals are in contact with the index cases, and have been separated into groups according to clinical and X-ray findings.

The percentage of those in the mani-

TABLE VI

DISTRIBUTION OF INDIVIDUALS WITH CLINICAL AND X-RAY FINDINGS IN HOUSEHOLD CONTACTS OF INDEX CASES BY BROAD AGE GROUPS

	Under 15		*15–45*		*45 and Over*		*Total*	
Type of Lesion	*No.*	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*
Manifest tuberculosis	2	1	6	3	5	7	13	3
Manifest tuberculosis arrested	..	..	3	2	10	14	13	3
Latent apical tuberculosis	..	..	11	6	13	18	24	5
Latent infiltration and/or caseous lymph nodes, childhood type	18	9	..	..	..	..	18	4
Calcified nodules and/or tracheo-bronchial calcification	67	35	82	43	14	20	163	36
Negative	107	55	86	45	29	41	222	49
Total	194	100	188	99	71	100	453	100

fest, manifest arrested, and latent apical tuberculosis groups increases with age. As would be expected, all the more serious forms of childhood type of tuberculosis are found in the early age groups. Fifty-one per cent of these contacts show evidence of infection; 11 per cent show evidence of manifest or latent apical tuberculosis. With increasing age a greater proportion of these individuals show evidence of manifest or latent apical tuberculosis.

In order to gain more complete information as to the number infected with tuberculosis within any population group, it is necessary to consider results of roentgenological examination in addition to the results of tuberculin testing. It is quite possible for an individual to have a negative tuberculin test, using the generally accepted dosages, and show on X-ray unmistakable evidence of infection, if we accept the appearance of a calcified lesion as evidence. In Table VII the age distribution of individuals tuberculin tested is shown, with further subdivision by X-ray findings of those tuberculin negative. The individuals included are those in contact with the index cases.

The percentage of positive tuberculin reactors rises with increasing age with the exception of a drop in the age group 35 to 44. In the next 2 succeeding age groups the percentage positive to tuberculin is 100, with a drop in the group over 65 years. When the percentages of those negative to 1.0 mg. of tuberculin, but with positive X-ray findings (9 per cent of the total number of individuals) are added to the preceding group, the total percentage of the 2 groups reaches 100 in the 35–44 year age group, and remains at that level. In 21 individuals, 5 per cent of the total, and chiefly in the young age groups, either no X-ray films were obtained, or interpretations of the films were not possible. If those with negative tuberculin and satisfactory X-ray films are considered, there is a total of 102 individuals tuberculin negative, 39 of whom, or 38 per cent, showed evidence of infection on the X-ray film.

It is of some interest to separate the household contacts by the type of index case, and make sub-division of these contacts by the combination of results of tuberculin testing and clinical and X-ray examination. This combination shows in each group those contacts

TABLE VII

AGE DISTRIBUTION OF INDIVIDUALS IN HOUSEHOLD CONTACT WITH INDEX CASES, TUBERCULIN TESTED, WITH THOSE NEGATIVE SUB-DIVIDED BY X-RAY FINDINGS

Age Group Years	*Total*	*Tuberculin Positive*		*Tuberculin Negative to 1.0 Mg.*					
				X-ray Positive		*X-ray Negative*		*Not X-rayed*	
		No.	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*
0–4	57	25	44	2	4	16	28	14	25
5–9	78	39	50	10	13	25	32	4	5
10–14	76	47	62	13	17	14	18	2	3
15–19	61	50	82	5	8	5	8	1	2
20–24	26	23	88	2	8	1	4	..	..
25–34	33	31	94	..	..	2	6	..	..
35–44	36	31	86	5	14	..	..	..	..
45–54	20	20	100	..	..	..	..	..	..
55–64	17	17	100	..	..	..	..	..	..
65 +	8	6	75	2	25	..	..	..	..
Total	412	289	70	39	9	63	15	21	5

positive to tuberculin and clinical and X-ray examination, those negative to both, and those positive to one and negative to the other. This arrangement is shown in Table VIII.

TABLE VIII

RESULTS OF TUBERCULIN TESTING AND CLINIC EXAMINATIONS IN HOUSEHOLD CONTACTS OF INDEX CASES, CLASSIFIED AS POSITIVE OR NEGATIVE

	Fatal Plus Sputum Pos.		*Mfst., Sputum Neg. or Unk.*		*Manifest, Arrested*		*Negative*	
	No.	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*	*No.*	*Per Cent*
Positive Tuberculin Positive Clinic Findings	59	60	34	34	23	37	28	25
Positive Tuberculin Negative Clinic Findings	25	26	43	43	19	31	39	35
Negative Tuberculin Positive Clinic Findings	4	4	8	8	8	13	19	17
Negative Tuberculin Negative Clinic Findings	10	10	16	16	12	19	25	23
Total	98	100	101	101	62	100	111	100

The percentage of individuals showing positive tuberculin and positive clinical findings is highest in that group in contact with the index cases which have been fatal or sputum positive, and lowest in that in contact with the index cases classed as negative. The percentage of individuals with negative tuberculin and no clinical findings increases with decreasing severity of the type of index case. The percentage of individuals with negative tuberculin tests and positive clinical findings also increases with decreasing severity of the type of index case. The numbers in the various groups are small so that differences may not be significant, but it is believed that they are indicative of what may be found with a greater experience.

An attempt has been made to assemble material which would be comparable to data collected in other areas where the case finding methods are similar to those in Tennessee. It seems necessary in most areas to plan definitely this program of case finding and follow-up in families in which cases of tuberculosis are found. The time and personnel necessary for completion in all the details of a comprehensive program are all too limited. It may be possible to modify the program by some such division of cases as has been used in this analysis.

It would seem highly desirable to examine contacts of fatal cases as promptly as possible. A close check should be kept on those individuals in contact with positive sputum cases. If it is not possible to follow up all cases and their contacts, certainly this group and their contacts should be given first preference, and usually concentration of effort is needed.

The cases classed as negative index cases should require very little follow-up. A rather complete history concerning the other members of the household will almost always serve to direct attention to any others in the household group who might have significant findings on examination.

Next in importance to the first group mentioned would appear to be the group designated here as manifest tuberculosis, sputum negative, or unknown. Sputum examinations are of value in this group, as it is of impor-

tance to know as definitely as possible the number and place of residence of all sputum positive cases within any given health jurisdiction. It is from this group that many individuals later show positive sputum. The severity of this type of case seems to be somewhat less so far as infection of contacts is concerned, and reëxamination and intensive follow-up activity of case and contacts should be guided to a great extent by the result of sputum examinations. In Williamson County, the number of sputum examinations, and the time interval, are dependent on the recommendation of the clinician. Usually, from 6 to 10 sputum examinations are requested within 1 to 2 weeks, followed by examination twice each month, and with the occurrence of any increase in severity of symptoms.

In the handling of cases designated as manifest arrested, it would seem advantageous to space visitation so that the occurrence of any symptoms of activity could be rather promptly reported and reëxamination arranged.

If, in the course of getting a history of the other members of the households, there are definite indications for examination of any of the other members of the household groups, this should be made, and the classification of the household changed, should more severe types of the disease be found. With very few exceptions, however, the index case represents the most severe type in the household.

A plan of operation of the kind outlined is in use in Williamson County at present with satisfactory results. The time of the nurses is spent to better advantage; it is possible to keep adequate check on the household groups; a larger case load can be carried; and more time is available for the location of new cases. The necessary reëxaminations can be so spaced as to cut down somewhat on the time and money usually spent on this particular phase of the program.

SUMMARY

1. The results of examination of household contacts of 4 types of index cases have been presented.

2. The group of contacts in households with a more severe type of index case is infected in a larger proportion, and the presence of an allergic condition is more readily demonstrable.

3. This group of contacts shows a higher proportion with the adult type of tuberculosis.

4. The effect of household contact is more demonstrable in the younger age groups.

5. Tuberculin testing of contacts does not identify all individuals who have been infected.

6. It is possible to plan a program of case finding and follow-up, taking into consideration the type of index case in a household, so that more can be accomplished with the same expenditure of time.

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The Trained Public Health Engineer in Public Health Departments*

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IT is the frank purpose of this paper to discuss the rôle of the public health or sanitary engineer in public health departments—state, county, district or unit, and municipal—in the United States and to demonstrate the specific value of his services.

Information has been gathered and statistics are presented which show to what extent trained engineers are now employed in various types of health departments. The potential field of opportunity is exhibited and discussed on the basis of county and city populations and the general densities of population development.

Nearly three and a half decades ago Professor William T. Sedgwick[1] defined public hygiene as "the science and art of the conservation and promotion of the public health." He further stated: "It has for its function the prevention of premature death and the promotion of normal life, health, and happiness in communities chiefly by the elimination or amelioration of unfavorable environmental conditions common to many persons or communities either at one time or at different times." Sedgwick's classical statement needs but little revision to reflect completely the present-day attitude toward the true function of sanitation.

In the new edition of Sedgwick's work, prepared by Prescott and Horwood,[2] sanitation is defined as:

> . . . the science and art of the conservation and promotion of the public health through the control of the environment. It has for its object the promotion of health, comfort, and convenience of communities. Accordingly, it deals with those health problems that are common to groups or communities, such as water supplies, sewerage and drainage, refuse collection and disposal, milk supplies, food supplies, restaurant and food store sanitation, ice supplies, air conditioning, lighting, school sanitation, roadside sanitation, sanitation of swimming pools, sanitary drinking facilities, street cleaning, parks and playgrounds, and the control of insects, rodents, odors, noises, obnoxious gases, and other nuisances and dangers to health.

It is of course obvious that the control of man's environment, whether it be in densely populated communities or in sparsely settled rural areas, in so far as such control reduces preventable disease, conserves life, or makes living safer and happier, is a public health enterprise, interpreted broadly, and is therefore a function of any appropriate public health agency.

Reflection perhaps, and experience assuredly, will indicate that in its physical aspects the control of the environment is largely an engineering matter; that is, it falls within the scope of the activities of engineers specifically trained and experienced in sanitation. Such engineers are now being more and more generally called public health en-

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gineers. Public health engineering may perhaps thus be said to represent the broadest possible conception of the older and original term sanitary engineering.

Among the score or more of activities listed by Prescott and Horwood as within the scope of sanitation, currently viewed, it will be seen that a very considerable number are almost purely of an engineering character and that in the solution of the problems presented by the other undertakings, the engineer's services can be of very distinct value.

The newer appreciation of the value of the services of the public health engineer, in collaboration with other trained workers in public health units, was expressed by Herbert Clark Hoover who, while President of the United States, addressed this Association at its opening session on October 24, 1932, at the Sixty-first Annual Meeting held in Washington, D. C. In the course of his remarks he said[3]:

> As a result of this experience in the flood area [the Mississippi River flood of 1927] I later called a meeting of public health officials and suggested the development of a stronger health service. Out of the conferences which were called as an outgrowth of this meeting, there evolved the idea of the most effective means of strengthening the public health service in harmony with the spirit of our American institutions. By this, I mean the idea of the county health unit. That is, that every county in the United States should set up for itself, as its minimum health organization, a unit consisting of a doctor, a sanitary engineer, and a trained nurse. These units were established in 100 counties in the flood area, and the extraordinarily successful results of their work confirmed the wisdom of the plan. The public health in these counties for 18 months after the flood was so much better than it had been in the 18 months before the disaster as to prove an object lesson in what could be done by organized public health work.

It may be appropriate to remark in this general connection that the problems of environmental control, whether in urban or rural areas, and particularly in the former, are so complex and technical that, to quote from Barron,[4] "the work of the uneducated, untrained and undirected sanitary inspector no longer meets the needs of the present social order."

TYPICAL PROBLEMS AND ACTIVITIES IN ENVIRONMENTAL CONTROL

Environmental control or sanitation, from the standpoint of this discussion, may perhaps be divided into 10 classes or categories of activities, as follows:

1. The quantitative and qualitative control of the air supply
2. The quantitative, sanitary and esthetic control of the water supply
3. The control of the milk supply; production, transportation, pasteurization, sale and handling
4. The control of other food supplies; production, transportation, preservation, sale and handling of raw food products; canning; refrigeration
5. The control of liquid wastes: sewage, trade or industrial wastes; sewers, drains and treatment plants; ultimate innocuous disposal
6. The control of solid wastes: collection, transportation, treatment and disposal of municipal refuse, including garbage, rubbish, ashes, street sweepings, night soil, dead animals
7. The control of the animal and insect carriers of infection: rodents, dogs, goats, cattle, hogs, etc.; preventive and palliative measures against flies, mosquitoes, fleas, lice, ticks, etc.
8. The provision of environmental cleanness: street cleansing; dust, soot and smoke control; swimming pool sanitation; street paving; camps and camp grounds
9. The provision of sanitary conditions in factories, shops, schools, churches, theatres and houses
10. The control of nuisances and other unsatisfactory conditions including odors, obnoxious gases, excessive noise, and the like

ENGINEERING ASPECTS OF THE CONTROL OF THE AIR SUPPLY

The air supply is of significance both from the qualitative and from the quantitative standpoints. The qualitative problem presents itself both in-

doors and, in densely developed communities, out-of-doors as well. The quantitative problem is one of confined spaces only.

The qualitative problem refers to the condition and character of the air supply as related to temperature, humidity, foreign gases, dust, soot, and smoke. Of the 6 qualitative features just named, all are of concern and are practically controllable, within confined spaces. The 3 last named, and perhaps foreign gases, also, to a certain extent, are of concern in outdoor air and are to a reasonable degree controllable.

Air conditioning, as this term is employed today, comprehends the cleansing of the air by washing and/or filtration, its humidification or dehumidification, as the case may be, and its temperature adjustment to insure comfort for any stated or fixed degree of humidity. It involves air movement, also, and, to be satisfactorily performed, all of these conditions, as required, must be provided simultaneously.

Dust, soot and smoke, and poisonous gases such as carbon monoxide, are all controllable in degree at a cost. The several respective procedures in such control involve the paving and cleansing of streets, the effective combustion of fuels, adequate ventilation, suitable industrial processes and methods, and the use of dust precipitation or retention devices in connection with chimneys and flues of boiler plants and of dust-producing industries.

The effective combustion of fuel in industry may involve some capital outlay; but the saving in fuel will frequently offset all of the required costs and pay a handsome financial dividend in addition, not to mention the dividend of a vastly improved environment. The effective combustion of fuels (coal, wood, oil) in houses (residences) is not a simple or readily controllable matter. For one thing, too many persons and too many different sorts of people are involved.

Industrial sanitation, among other things, is concerned with the control of industrial processes and methods, whereby dangerous procedures may be eliminated, and poisonous and obnoxious vapors and gases, dust, etc., may be rendered harmless by removal, eradication, or neutralization.

The dust problem is one of significance because the inhalation of air heavily loaded with dust may and usually does, if continued over considerable intervals, produce a mechanical clogging of the lung tissues and passages. Certain types of dust produce very definite physiological derangements and diseases, such as silicosis, pneumoconiosis, lead poisoning, etc. Two sources of dust are to be recognized: those which are of the exterior and those which originate in enclosed spaces. Exterior sources of dust are streets, vegetation, and chimneys, flues, etc., ejecting smoke and soot as well as mineral dusts. Interior sources of dust are the wear and attrition of floors and the dusty trades or processes.

The dusty trades and processes are very numerous in our modern industrial world. Among them may be named the following: carding of wool and flax; grinding of metals and minerals; milling of wheat and other grains; crushing of stone, coal, and other minerals; manufacture of cement and other finely divided or ground products; sawing and planing of wood and wood products; polishing of a myriad of articles; weighing and sacking of powders and other dusty products; glass manufacture; street and indoor sweeping by brooms; sorting of wool, rags, etc.

Artificial ventilation concerns itself with public buildings in which great numbers of people congregate, such as

schools, churches, theatres, etc. It is also required for all long vehicular tunnels wherein large numbers of automobiles may be in transit at one time. It may be required for large garages which are not or cannot be adequately provided with direct window ventilation.

Some of the air supply problems and general control procedures have been outlined with a view to demonstrate that they are for the most part physical and mechanical in their nature and that they fall therefore within the field of engineering. Some of them are highly technical and involved, requiring special aptitude, training, and experience even for the engineer. The public health engineer in health departments will find many air control problems in which he must act in an advisory or even a directing capacity, particularly in populous areas, and, among these, especially in industrial districts.

ENGINEERING ASPECTS OF THE CONTROL OF THE WATER SUPPLY

The modern water works system must be dependable from the standpoint of physical safety; it must be able to yield an abundant, unfailing supply; and this supply must meet rigorous sanitary and esthetic standards. With the generally increasing pollution of both surface and sub-surface sources, the production of an uninterruptedly safe and satisfactory supply frequently becomes a very difficult matter. Important as it is that water supplies shall be free from all pathogens, and virtually free from all bacteria, that is not enough. To meet present-day requirements, turbid waters must be made brilliantly clear; hard waters must be softened; aggressive waters must be hardened or adjusted with respect to their hydrogen ion content; colored waters must be decolorized; tastes and odors must be removed, together with excessive iron, manganese, and other unwanted substances.

Preventive measures must oftentimes be exercised to restrict pollution, or the growths of plankton, or discoloration, or the causation of other unsatisfactory conditions amenable to control. In some cases the water sources have become polluted to such an extent with sewage and trade wastes that their purification for water supply purposes becomes in effect a salvage of sewage.

The works and procedures required to develop, transport, distribute, and treat water supplies are all of an engineering character. The problems presented frequently demand the highest skill and experience in their solution. In meeting the more difficult problems of treatment the engineer collaborates with the chemist, the bacteriologist, and other technical specialists.

It is the function of health departments to advise with respect to water quality problems and to exercise general supervisory powers to the end that the public health and comfort may be vouchsafed. The water supply is one of the most fundamental of public services and, because of its potentialities as related to disease, it is of extraordinary concern to health departments. State and county departments should maintain rather constant supervision over the water supplies coming within their jurisdiction, particularly the smaller ones whose personnel and equipment are limited. Such supervision should comprehend systematic inspections on the part of the public health engineering staff, with adequate sampling and laboratory checking.

In illustration of the water supply problems faced by a single county health department, that of Westchester County, N. Y., Barron[4] stated that there are in that county 23 sources of supply and 41 public distribution systems, a number so large that it would be difficult if not impossible for a state department of health to maintain

supervision without local engineering assistance. Improvements in equipment and operation of chlorination plants were found to be necessary in most cases. Corrosion problems were acute in several systems. Other important responsibilities were the prevention of pollution on watersheds, the promotion of improved public supplies in replacement of inadequate, unsuitable private supplies, and the improvement of private supplies which were found to have logical reasons for continued existence.

Fuller[5] calls attention to the importance of establishing a consistent policy with respect to all water supplies in any public health administrative district because of the frequency of changes in the personnel of the local water supply management boards.

ENGINEERING ASPECTS OF THE CONTROL OF THE MILK AND FOOD SUPPLIES

The mechanical problems of transportation, pasteurization, canning, and refrigeration of milk and other food products are essentially engineering in their nature and should be attacked and solved from such a viewpoint. Other correlated problems such as are referred to below, are not, of course, in the category of engineering activity, *per se*. Yet the methods of approach and the procedures utilized should be of the same order in respect to rationality and regimentation.

Referring again to the Westchester County experience, Barron[4] states that 35 health officials in that district had been issuing permits for the sale of milk. None of these officials had been able to examine the various milk supplies or to apply adequate and proper technical supervision to either the local or distant milk sources. The county health department established a balanced and effective control of the entire system of milk supply, comprehending the necessary inspections of all dairies, the veterinary examination of all herds, the making of bacterial counts of the supplies from all producers, and the systematic inspection of all tributary shipping stations, of pasteurization and bottling plants, and of distributing stations.

Health departments must develop sanitary regulations governing food-selling establishments and must see that these are enforced. Meat coming from sources other than those regularly inspected and approved by federal agencies should be inspected and stamped by the local authorities. The protection of all foods from insects and dust and from promiscuous handling in meat and fish markets, vegetable shops, delicatessen stores, bakeries, and the like, must be insisted upon and vouchsafed by systematic inspections.

ENGINEERING ASPECTS OF THE CONTROL OF SEWAGE AND INDUSTRIAL WASTES

The collection and innocuous disposal of a community's liquid wastes—sewage, trade wastes, and the like—is an absolutely fundamental necessity and a matter of vital consequence to the health and comfort of its people. The proper supervision and control of sewerage systems and sewage treatment and disposal plants ranks in importance with the control of the water, milk, and other food supplies. In this field the problems are almost wholly of an engineering character demanding training and experience of fully as high an order as that demanded by any other exacting public health engineering activity, not excluding water purification. As a matter of fact sewage treatment practice is less standardized, perhaps, than any other activity of the sanitary engineer.

The health authority, with the aid and advice of the public health engineer, can and should determine upon and develop an intelligent, rational public policy with respect to sewage and

trade wastes treatment and disposal. It can and should influence and direct public opinion to the end that suitable and adequate methods and means for treatment and disposal be provided by the responsible authorities. Existing plants should be regularly inspected and samples taken and examined in the laboratory to demonstrate the adequacy and efficiency of treatment. This is especially true of small plants with untrained operators and few or no laboratory facilities. Institutional and private plants generally fall within this category.

The disposal of raw or inadequately treated sewage has very often resulted in a serious contamination of inland streams, tidal estuaries, and even of ocean shores. It has frequently destroyed the esthetic value of water courses and has sometimes caused the water to be unfit even for an industrial use. Bathing beaches have become insanitary and objectionable in appearance. Notwithstanding the great potency of the several agents of self-purification, taken together, it must be clearly recognized that there is scarcely a stream in America long enough to insure complete redemption from the effects of sewage contamination judged by the criterion of safety for drinking purposes. It is obvious that the treatment of sewage may be necessary, therefore, in order to maintain the redeemable or esthetic character of any body of water into which it may be considered expedient to discharge the effluent. The degree of treatment, *i.e.,* the extent of improvement provided, must be determined by the conditions of each case. The kind of treatment will be largely determined by the degree of improvement demanded by these conditions considered in conjunction with physical and economic considerations. The problem is by no means simple. It demands skill and judgment born of experience.

ENGINEERING ASPECTS OF THE CONTROL OF REFUSE COLLECTION AND DISPOSAL

The municipal refuse problem has both a sanitary and an esthetic significance. Each is important. The most significant element of municipal solid refuse is the garbage. Inasmuch as this material constitutes a much-sought-after food for flies and rats, and provides an excellent breeding place for the former, its sanitary significance becomes obvious. Garbage, moreover, is highly putrescible and its decomposition gives rise to obnoxious odors. Its esthetic significance, therefore, becomes apparent. Some of the materials comprehended by the term rubbish, such as foul, dirty rags, have a public health significance. Rag sorting, for example, is recognized as one of the dangerous trades. Heaps of rubbish afford a haven for rodents and in that respect are to be reckoned with from the public health standpoint.

The community refuse problem is ordinarily presented in 4 distinct and more or less independent phases; namely, (1) the storage of the refuse, with or without segregation, on the householder's premises; (2) the collection of the refuse by the accredited agency; (3) the transportation of the refuse through the streets of the community; and (4) the proper disposal of the refuse as a whole (mixed refuse) or in separate portions (classified refuse).

The problems thus presented are complicated. In their physical aspects they are for the most part in the sanitary engineer's particular field of activity. Their solution represents an important item in the practical control of man's urban environment. Too often these problems have been relegated to untrained, disinterested administrators.

It is now being proposed in some quarters that the garbage of the community be ground up either by the individual householders or by the com-

munity at central stations, and disposed of by discharge into the sewers. Such disposal will add enormously to the organic matter load carried by the sewage and will place that burden upon the treatment plant or receiving stream. A definite policy with respect to such a procedure should be determined upon by the responsible authorities, including the health agency. It is a highly involved technical matter and should be so considered.

ENGINEERING ASPECTS OF THE CONTROL OF ANIMAL AND INSECT CARRIERS OF INFECTION

In the control of the animal and insect carriers of infection the public health engineer coöperates with the epidemiologist, the entomologist, and the veterinarian.

The carriers involved are: (a) man himself as the chief carrier of infective agents of mankind; (b) all animals subject to rabies; (c) rodents subject to fleas and bubonic plague; (d) animals which carry ticks, or are subject to tick infections; (e) hogs which convey *trichinella spiralis;* (f) cattle and hogs which are the intermediate hosts of *taenia saginata* and *taenia solium;* (g) cattle infected with bovine tuberculosis; (h) goats, cows and hogs which convey the organisms causing undulant fever; etc.

The principal insects involved are: (a) flies, biting and nonbiting, active and passive carriers of any and all pathogenic bacteria which cause intestinal and other diseases in man, including typhoid fever, cholera, bacillary dysentery and tularemia, together with the infective forms of many of the protozoa; the cysts of *Endameba hystolytica,* and the eggs of helminths which do not require an intermediate host, such as *ascaris lumbricoides* or *Hymenolepis nana;* (b) mosquitoes which are responsible for yellow fever, malaria, dengue and filariasis (bancrofti); (c) fleas which convey plague (*B. pestis*); (d) lice which convey the organisms of typhus, trench and relapsing fevers; (e) ticks which convey the organisms of relapsing fever, Rocky Mountain spotted fever, and tularemia; (f) sand flies or moth midges conveying the organisms of pappataci fever, and *Leishmania denovani,* the etiological agent of kala-azar (Leishmaniasis); (g) bedbugs, roaches, and ants which, while perhaps not directly concerned with the dissemination of the causative organisms of specific infectious diseases, are nevertheless unwelcome inhabitants of man's environment.

Some of the more important preventive measures available for the control of the mosquito and mosquito-borne diseases, such as the elimination of breeding places by the draining of swamps and shallow pools, the rectification of stream beds and channels, the filling of small holes and pools which cannot be drained readily, and the removal of vegetation from and the steepening of banks of ponds and streams, also the oiling of undrained or undrainable water surfaces at sufficiently frequent intervals, are all of an engineering character and can best be accomplished under the direction of the trained public health engineer.

Other preventive measures and those which are palliative for the control of the mosquito, as well as other insects and animal vectors, may well be conducted by engineers trained and experienced in such work.

ENGINEERING ASPECTS OF THE PROVISION OF ENVIRONMENTAL CLEANNESS

The major problems concerned with the production and maintenance of environmental cleanness are physical and mechanical in their nature and hence within the scope of the sanitary engineer's activities. Among the acts

which bring about or conserve cleanness are such obvious undertakings as the provision of street paving and the operation of street cleansing. The control of dust, smoke and soot is of fundamental importance from the standpoints of both health and comfort. Because of its relation to their comfortable use, even though the public health may be involved only secondarily, it is the duty of health departments to insist upon the continued cleanliness of all publicly used buildings, including comfort stations, and of all recreational facilities and areas.

Swimming pool sanitation has been included in this group of activities having to do with environmental cleanness although it is often set apart as an independent item because of its public health implications. Public swimming baths have already become a nationwide institution. Their numbers will doubtless continue to increase for some years to come. Swimming pool regulation has therefore become a significant public health measure in view of the great numbers of patrons involved and the danger of disease attendant upon the use of improperly designed, constructed, and operated baths. In the provision and maintenance of a suitable and satisfactory water supply, problems of filtration, plankton control, disinfection, water heating and circulation, etc., are all encountered. Other features of sanitation are vitally important, also, and demand constant vigilance. Swimming pools should be operated under permits and regulations of the resuponsible health department. They should be regularly inspected and samples of the water should be systematically collected and subjected to laboratory examination.

Health departments should assume responsibility for the training of operators and this training should be akin to that demanded for water works operators.

ENGINEERING ASPECTS OF THE PROVISION OF SANITARY CONDITIONS IN BUILDINGS

It is or should be the duty of health departments to regulate and inspect all plumbing, heating, ventilating, air conditioning, dust control, and other equipments and installations which affect the health, comfort, and general well-being of workers in factories and industrial plants of all kinds, of children in the schools, patrons of theatres and other meeting places, as well as residents in private dwellings, the last particularly with respect to plumbing and gas appliance installations. Many of the problems presented are of an engineering nature.[6] The control procedures should be directed by experienced persons gifted with common sense and the power of rational appraisement.

ENGINEERING ASPECTS OF THE CONTROL OF NUISANCES

Many of the nuisances occurring in urban areas arise out of a failure to control properly the environmental conditions briefly outlined above. In particular, nuisances are caused by excessive numbers of various sorts of insects; by odors from sewerage works, polluted streams and shores, refuse collection, transportation and disposal procedures, industrial plants, and the like; by obnoxious vapors and gases; and by excessive noise. Here again, the problems are frequently of a sort which demand the skill and training of the public health engineer in their solution.

SCOPE OF THE PUBLIC HEALTH ENGINEER'S TRAINING

Courses for the education and training of sanitary and public health engineers have been introduced and developed in a considerable number of the universities and larger technical colleges or schools in the United States.

Probably all degrees of training are provided therein, from the highly specialized courses giving comprehensive instruction in the art of sanitation, in addition to the basic curriculum of civil engineering, to those which might be more properly classed as almost strictly civil engineering with a limited amount of stress placed on water supply and sewerage problems only.

There can be no question that the ideal course should comprehend fundamental training in inorganic, organic, and physical chemistry, in bacteriology, microscopy, zoölogy and entomology, together with the more usual courses in water supply and sewerage engineering, and in water and sewage treatment. In addition there should be competent courses in water and sewage analysis and general laboratory technic, together with studies in the field of general sanitation.

The scope of the ideal public health engineering course has been suggested, it is believed, by the foregoing brief survey of the engineering aspects of environmental control. It is obvious that expertness or proficiency in all of these matters cannot be acquired at all in most institutions or, for that matter, in any institution within the usual time allotment. But a thorough grounding in the more essential principles and procedures can be acquired if the facilities are offered. Upon such a basis experience will soon develop the necessary proficiency if the engineer is of the right sort and remains a student while he practices his profession.

STATISTICAL REVIEW OF THE EMPLOYMENT OF PUBLIC HEALTH OR SANITARY ENGINEERS IN PUBLIC HEALTH DEPARTMENTS IN THE UNITED STATES

In 1934 the writer prepared a questionnaire which was sent to all state departments of public health, by which it was hoped to determine for each state:

1. The number of trained sanitary or public health engineers employed in the division or bureau of sanitary engineering of the state department of public health
2. The number of counties and municipalities which employ such engineers in their public health departments
3. The number of sanitary or other districts which employ such engineers and for what purposes
4. The number and names of counties having well organized, full-time health departments
5. The number and names of cities having well organized, full-time health departments

In those cases where the state department of public health had a division or bureau of sanitary engineering, the questionnaire was sent to the chief engineer or director; otherwise to the chief administrative officer of the board. Replies were promptly received from all but 7 of the 48 states. A second inquiry brought replies from 5 additional states; and a third, 1 more; only 1 state has failed to furnish the information desired.

In addition to the information requested, each state sanitary engineer was asked to express his judgment with respect to the lower population limit at which sanitary or public health engineers should or might reasonably be expected to be employed in the health departments of: (1) cities; (2) counties, exclusive of cities having population as great or greater than the lower limit set for (1) cities.

The information thus made available has been prepared in the form of a statistical summary for each state and for the United States, together with certain relevant data concerning the population, area, and population density of each state; the numbers of counties, total, total having populations in excess of approximately 50,000, and total having net populations of approximately 50,000 exclusive of cities having approximate populations of 50,000 or over; and the total number of cities in

each state having populations in excess of approximately 50,000.

PUBLIC HEALTH ENGINEERS IN STATE PUBLIC HEALTH DEPARTMENTS

Beginning with the epoch-making establishment of an engineering department by the Massachusetts State Board of Health in 1886, when Frederick P. Stearns (who later became one of the most distinguished engineers of his time) was appointed engineer to the board, an appreciation of the value of the services of engineers in state departments of public health has gradually been developed. It is no longer questioned that state departments of public health should maintain an engineering bureau and staff. Forty-three states already have engineering bureaus with full-time public health or sanitary engineers and one other state employs such an engineer on a part-time basis. The total number of trained engineers thus regularly engaged is about 190. In addition, several state health departments employ sanitary chemists and operate engineering laboratories, *i.e.*, for water and sewage analysis, primarily.

The statistics presented herein are intended to reflect reasonably normal conditions and, specifically, those of the year 1934. At present (September, 1935) relatively large numbers of engineers, presumed to be trained in public health work, in so far as such are available, are being employed throughout the country as an emergency relief measure. Many of these have been appointed to serve with the U. S. Public Health Service but have been assigned to work with state public health departments on various types of environmental sanitation projects such as sanitary privies, mosquito control, etc. Others are temporarily employed directly by the state health departments, their salaries being paid out of federal funds allocated for the purpose.

Whipple [7] has presented a clear picture of the effective work of the engineers of the Massachusetts State Board of Health from the beginning until about the year 1917.

Tisdale [8] has also given illuminating insight into the work of the state sanitary engineer. He quotes Whipple as having said, "Good advice by the sanitary engineer to cities and towns in the state, is on the whole more beneficial than all the permits, approvals and orders ever issued by a department." With respect to the work of state health departments, Tisdale calls attention to the vital quality of the sanitary engineer's services in matters of water supply and sewerage, sanitary milk production, joint federal and state sanitation programs (including stream pollution control), recreational sanitation, industrial wastes control, swimming pool sanitation, and sanitation legislation. He further emphasizes the salutary fact that the tenure of office of state sanitary engineers has been fairly secure and he cites the cases of a considerable number of engineers whose terms of service have ranged from 2 decades to nearly 50 years.

PUBLIC HEALTH ENGINEERS IN COUNTY OR COUNTY-UNIT HEALTH DEPARTMENTS

While a considerable proportion of our state departments of public health have long recognized the value of the services of sanitary and public health engineers in matters dealing with environmental sanitation, this unfortunately cannot be said with respect to county departments of health. It is only recently that an appreciation of the value of such service has begun to affect the operations of the smaller units of public health administration.

By reason of the multiplicity of village, town, and city governments and their various and ofttimes inconsistent and conflicting regulations, and

furthermore because of the all too common inadequacy of planning, construction and operation of sanitary facilities and the lack of recognition of local sanitation problems, as Barron[4] observes, there are many complications to be overcome in effectively accomplishing environmental control in counties and county health units. For these reasons the services of trained public health engineers, capable of recognizing and directing the solution of the many problems demanding attention and solution, are all the more necessary.

It appears that in the entire United States there are probably less than 25 public health engineers regularly employed in 21 county, county-unit, or district health departments in 10 states. On the other hand, there appear to be between 400 and 500 purportedly well organized, full-time county, county-unit, or district health departments, many if not all of which should enlarge the scope of their activities and increase their effectiveness by establishing bureaus of public health engineering and employing trained personnel.

In the 48 states there are 3,072 counties, of which number 437 have populations in excess of approximately 50,000, and 376 have populations exceeding approximately 50,000, exclusive of cities of approximately that same population.

Thirty-one state sanitary engineers were willing to express an opinion concerning the lower population limit of counties in which sanitary or public health engineers should or reasonably might be expected to be employed in the health departments thereof. These population limits were specified to be exclusive of the aggregate populations of cities having populations of sufficient size to warrant, in their opinion, the employment of sanitary or public health engineers in their own health departments. The opinions varied from "every county" and "every county health unit" to a population of 200,000 in one case, and 500,000 in another. The minimum assigned figure was 10,000. The mean of all of the estimates, expressed in numerical terms, is about 57,000. Exclusive of the two highest figures noted above, the average figure is about 34,000. It would seem to be rational to conclude that every county, county-unit, or district having a net population, as above defined, in excess of 50,000 at most should have the benefit of the full-time services of one or more public health engineers. In areas where the problems of sanitation are for some reason acute, or where the economic status of the population is high, public health engineers should be employed where the population is smaller, possibly much smaller, than the figure just named.

PUBLIC HEALTH ENGINEERS IN CITY HEALTH DEPARTMENTS

The appreciation of the value of the services of the public health engineer in the health departments of cities is apparently even less manifest than in county, county-unit, or district departments. It is also at least as recent. This lack of recognition is amazing in view of the great numbers of environmental sanitation problems demanding attention and solution in practically all urban areas, and particularly, of course, in the larger cities.

This matter has been well stated by Connolly[6] as follows:

> It was not so many years ago when people generally thought of the field of sanitary engineering as one limited to questions of water supplies, stream pollution, trade wastes, and the collection and disposal of garbage and sewage. Engineering methods have proved to be so successful that now they are being applied in many other lines of sanitation and at present the sanitary engineer is called upon to deal also with pasteurization of milk; protection of oyster-growing areas;

problems of housing, such as overcrowding, light, heat, and ventilation; malaria control; plague eradication; destruction of vermin; industrial sanitation; smoke abatement; noise reduction; protection of swimming pools and bathing beaches; special hazards of comparatively recent importance, such as poisoning by refrigerants, by gases and other substances used in fumigation, and by hair dyes, shoe dyes, moth-proofing compounds, etc.; and the abatement of nuisances of many kinds.

The sanitary engineer is or should be also particularly responsible for plumbing installations and cross-connections between the public and private water supplies.

Connolly [6] further states:

The work of the city sanitary engineer is one that touches almost every phase of urban life in some way. The field is constantly growing as new materials and usages are developed. The scope is as broad as man's environment. The necessity for the work will continue as long as man continues to be a gregarious animal and seeks the company of his fellow man. It is truly a task to challenge all that is best in a man and reward him with the knowledge that he is doing his bit to make his city a more healthful, happy, and useful community, and to give to his children a better environment than his own has been. There is no question but that the next decade will see a tremendous development in the sanitary engineering activities in city health departments in all parts of the country, for we are living in an age of engineering achievement. Municipal administrative health officers not provided with such a bureau in their departments are at a distinct disadvantage when dealing with many of the present-day developments, and are now asking their city councils to permit them to follow the example of the United States Government and of so many state health commissioners, in creating an efficient, modern sanitary engineering bureau. The public realizes as never before that in this era of specialization, specialists in this field will do much to make life richer and more enjoyable as well as longer.

The information gathered in connection with this study indicates that there are probably not more than 30 public health engineers employed in 24 city health departments in 13 states. There appear to be approximately 320 well organized, full-time city health departments in the United States, practically all of which should follow the example of such cities as Atlanta, Chicago, Cincinnati, Cleveland, Dallas, Detroit, El Paso, Fort Worth, Jacksonville, Memphis, New York, St. Louis, and Tucson, in enlarging the scope of their activities and increasing their effectiveness by establishing bureaus of public health engineering manned with trained, capable engineers.

In the entire country there are 211 cities having populations of approximately 50,000 or over and some 280 whose populations are 35,000 or over.

Thirty-five state sanitary engineers kindly gave thought to the determination of a lower limit of population of cities in which sanitary or public health engineers should or might reasonably be expected to be employed in the health departments thereof, and expressed their opinions in numerical terms. The assigned figures ranged from a minimum of 2,500 to a maximum of 100,000. The average of the 35 values submitted is about 34,000, or the same as the mean figure for county health departments excluding the two highest figures, as above noted. The average of 24 similar estimates of a lower population limit obtained by the Committee on Municipal Public Health Engineering, Public Health Engineering Section, this Association, is 40,000. The figures submitted range from 5,000 as a minimum to 100,000 as a maximum. It would seem to be fair to conclude that every city having a population of 50,000 at most should enjoy the benefit of the full-time services of one or more sanitary engineers in an organized, properly equipped bureau. In well-to-do communities or those facing acute sanitation problems the lower limit of size for which such services are provided should unquestionably be smaller; in some cases only

a fraction of the population size stated above as a mean of the several estimates. If the supervision of water and sewage treatment plants is also assigned to the health department engineer, the population limit might well be lowered to 10,000 or even 5,000.

SANITARY DISTRICT ORGANIZATIONS

Inquiry was made to determine the number of sanitary districts employing trained sanitary engineers for the conduct of their activities. Such districts are ordinarily charged either with water supply and sewerage undertakings, including treatment, or with mosquito eradication, as the case may be. The information secured indicates that there are at least 32 such districts in 9 states.

FEDERAL SERVICE

No attempt has been made to determine what federal agencies employ sanitary engineers other than the U. S. Public Health Service. In that service the sanitary or public health engineers enjoy the same rank and pay as do the medical officers and are in line for promotion under similar regulations. The total number of engineers now authorized and commissioned is 22, distributed in rank as follows: senior surgeons (senior sanitary engineers), 1; surgeons (sanitary engineers), 15; passed assistant surgeons (passed assistant sanitary engineers), 5; assistant surgeons (assistant sanitary engineers), 1.

It is gratifying to realize that for many years the Service has exerted a stimulating influence with respect to the employment of public health engineers in state health departments and elsewhere and more recently in the health departments of smaller administrative units.

CONCLUSIONS

The environmental control activities which demand or at least would be definitely promoted by the services of trained public health engineers can be placed in 10 categories, as follows: (1) the water supply; (2) the air supply; (3) the milk supply; (4) food supplies other than milk; (5) liquid wastes (sewage, industrial wastes, etc.); (6) solid wastes (municipal refuse); (7) animal and insect carriers of infection; (8) environmental cleanness; (9) sanitary conditions in buildings; (10) nuisances and other unsatisfactory conditions.

The writer has attempted to outline and briefly discuss the engineering aspects of each of these groups of activities and to show in what more or less specific respects the training and experience of the sanitary or public health engineer would be of particular avail. It has been demonstrated, it is hoped, that the number of phases of environmental sanitation in which the services of the trained engineer can be of material worth, is very large. In a not inconsiderable proportion of these undertakings his services are, in fact, well nigh indispensable if the most effective results are to be secured.

It is no longer questioned that state departments of public health should maintain an engineering bureau and staff of trained sanitary engineers. Forty-three state departments are already so organized and employ at least one full-time engineer. Another state employs a sanitary engineer on a part-time basis.

It is only recently, and as yet in a pitifully small way, that appreciation of the value of such service has been recognized and expressed by the employment of public health engineers in the smaller units of public health administration: county, district or unit, and municipal.

Summarized statistics of employment of public health engineering services in these units have been presented in the foregoing discussion.

There are 22 sanitary engineers regularly commissioned in the U. S. Public Health Service.

It is apparent that there is an enormous potential field for the useful work of the public health engineer in federal, state, district or county, and municipal public health departments. The most effective progress of environmental sanitation throughout the United States and the welfare of the engineer are both deeply concerned.

RECOMMENDATION

The writer recommends that the Committee on Scope of Technical Activities of the Public Health Engineering Section of this Association prepare a circular which can be sent to the responsible administrative officers of all state, county, county-unit, district, and municipal health departments outlining the character and value of the services of the trained public health engineer in such organizations.

ACKNOWLEDGMENTS: The writer wishes to express his obligation to the state sanitary engineers and medical directors of state public health departments who have so kindly furnished the statistical information concerning the employment of public health engineers in the several types of administrative units which have been discussed and concerning the names of counties, county-units, and cities which maintain well organized, full-time health departments.

Several of the state sanitary engineers offered very helpful criticisms and suggestions, particularly Bair, Boyce, Ferguson, Morton, and Stevenson. The writer is also indebted to N. M. Fuller and Professor Thorndike Saville for valuable comments and to William H. Cary, Jr., Chairman, Committee on Municipal Public Health Engineering, this Section, A.P.H.A., for useful data concerning the employment of public health engineers in municipal public health departments in the United States.

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Life Expectation

IN England and Wales in 1875 the average expectation of life of males at birth was 41 years and of females 44 years.

Now let us see the position today. The average expectation of life of males at birth is 57 years and of females 61 years. This is a remarkable change. In the short period from 1875 to 1935 the length of life in males has increased by 16 years and the length of life for females has increased by 17 years.—James Fenton, M.D., Public Lecture to the South African Health Congress, *J. Roy. San. Inst.*, May, 1936, p. 642.

Detection of Shedders* of Streptococci Responsible for Infectious Bovine Mastitis†

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DURING the past few years increased interest in the control of bovine mastitis has caused a corresponding increase in the study of streptococci commonly found in freshly drawn milk. In order to secure further data on the characteristics of these organisms and their possible relation to chronic bovine mastitis, milk samples were collected aseptically from each quarter of lactating animals in 15 different herds. The samples were examined for evidence of mastitis and the presence of streptococci. Cultures of streptococci obtained from 970 samples have been isolated and studied. It is the purpose of this paper to describe the characteristics of these organisms, their relation to other laboratory evidence of mastitis, and the relative efficacy of different methods in detecting shedders of streptococci.

METHODS

The following determinations were made on each sample: physical appearance, reaction to bromthymol blue, leucocyte count, sediment volume, types of colonies produced on blood agar plates, and the presence or absence of chains of spherical cells in incubated portions of the sample. Streptococci, when present, were isolated and the following properties determined: hemolysis on cow's blood agar, reaction in litmus milk, ability to hydrolyze sodium hippurate, ability to reduce methylene blue milk (1:5,000), and ability to produce a distinctly acid reaction with Andrade's indicator in serum broth containing lactose, mannitol, inulin, raffinose, arabinose, and salicin.

CHARACTERISTICS OF STREPTOCOCCI STUDIED

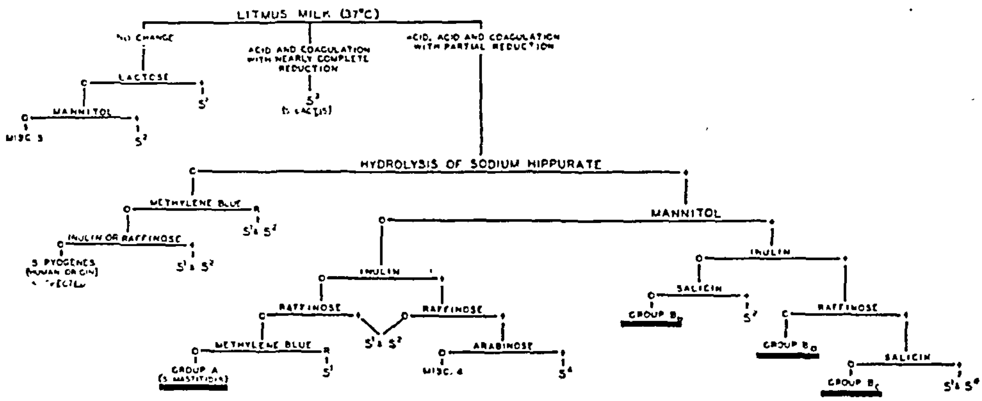
By comparing the biochemical properties of each culture with the presence or absence of laboratory evidence of mastitis at the time and after the cultures were isolated, it was found that the different streptococci studied could be placed in one of three groups: Group A, designated as *Streptococcus mastitidis,* which appears to be the principal causative agent in infectious chronic bovine mastitis; Group B, which appears to be associated with a relatively mild form of mastitis from which animals usually recover; and a group composed of various types of saprophytic streptococci commonly found in the mouth, on the skin, and in the excreta of cattle. The principal

* The term "shedders" is used to designate lactating animals which eliminate the organism in question through the milk.

† Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

FIGURE I

PLAN FOR IDENTIFYING WEAKLY HEMOLYTIC STREPTOCOCCI OF BOVINE ORIGIN



LEGEND

S¹-BOVINE FECAL STREPTOCOCCI, DESCRIBED BY AYERS AND MUDGE (9)
S²-STREPTOCOCCI FROM MOUTH OF CATTLE, DESCRIBED BY AYERS AND MUDGE (9)
S³-S LACTIS AS DESCRIBED BY AYERS, JOHNSON AND MUDGE (18)
S⁴-S BOVIS AS DESCRIBED BY SHERMAN AND STARK (19)

differential properties of each of the three groups are shown in Figure I.* Cultures classed as saprophytes are designated as S^1, S^2, S^3, and S^4.

Streptococcus mastitidis (Group A)—Members of this group are identified by the following characteristics: they acidify and coagulate litmus milk with partial reduction of litmus; hydrolyze sodium hippurate; fail to produce a distinctly acid reaction in serum broth containing mannitol, inulin, raffinose, arabinose, and sorbitol; and do not, as a rule, reduce methylene blue milk. Reactions in trehalose, salicin, and glycerol broth were found to be variable.

Streptococcus mastitidis (Group A) differs from *Streptococcus pyogenes* by producing surface colonies on blood agar that are surrounded by a narrow band of partial hemolysis, which is in marked contrast to the wide band of complete hemolysis usually produced by colonies of *Streptococcus pyogenes*. The mastitis organism hydrolyzes sodium hippurate and is a high acid producer in dextrose broth. As a rule, the reactions of the two organisms in litmus milk differ also; the human pathogen produces an acid reaction without coagulation and without reduction, while the animal pathogen causes an acid reaction with coagulation and partial reduction of the litmus.

Group B—This group is not as well defined as Group A. Members of Group B differ from those of Group A by fermenting mannitol, by usually reducing methylene blue milk, and by fermenting either inulin or raffinose, or both.

Saprophytes—This group contains various types of saprophytic streptococci which have been described[2, 3, 4] as common inhabitants of the mouth, skin, and excreta of cattle. While these organisms differ considerably in their biochemical properties, they may be distinguished from *Streptococcus mastitidis* (Group A) and the organisms in Group B, by their reaction in litmus milk and by their fermentative properties in carbohydrate broth.

RELATION OF DIFFERENT TYPES OF STREPTOCOCCI TO MASTITIS

Cultures obtained from samples drawn from individual quarters of animals in 15 experimental herds were

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* Figure I has been described previously in Storrs Experiment Station *Bulletin 195*.[1]

identified by the use of the diagram shown in Figure I. The milk samples were also examined for other evidence of mastitis; namely, a leucocyte count of 500,000 or more cells per c.c., sediment volume of 0.5 per cent or more, and a positive reaction to the bromthymol blue test. The number of cultures placed in each of the three general groups described, and the relation of the cultures to other evidence of mastitis, are shown in Table I.*

TABLE I

RELATION OF DIFFERENT TYPES OF STREPTOCOCCI OF BOVINE ORIGIN TO EVIDENCE OF MASTITIS

Source	Number of Cultures	Identified as: Group	Identified as: Number	Number Associated with Other Evidence of Mastitis	Number from Apparently Healthy Quarters
15 experimental herds	970	A	828	809	11(8)*
		B	56	46	10
		Saprophyte	86	3	83

* No data following time culture was isolated.

Of 970 cultures examined, 828 were placed in Group A, 56 in Group B, and 86 were regarded as saprophytes. Of the 828 Group A cultures, 809 or 97.7 per cent were associated with other evidence of mastitis. Forty-six of the 56 cultures placed in Group B were also from quarters showing evidence of mastitis. Only 3 of 86 cultures classed as saprophytes were from diseased quarters. In these instances, it appears probable that streptococci which are ordinarily harmless gained entrance to the affected quarter as a result of a previous injury.

DETECTION OF STREPTOCOCCI RESPONSIBLE FOR MASTITIS

Three hundred and sixty samples of milk collected from the college herd in 2 of the regular bi-monthly tests were examined for the presence of streptococci by 6 different methods. Blood agar plates were inoculated by 3 different methods: (1) streaking with whole milk, (2) streaking with sediment from a centrifuged (10 c.c.) portion of the given sample, and (3) the standard dilution method. Microscopic examinations were made of films prepared from whole milk, sediment from a centrifuged 10 c.c. portion of the sample, and from a portion of the same sample following incubation over night at a temperature of 37° C. The results obtained are recorded in Table II.

Of 79 samples from quarters showing laboratory evidence of mastitis, as revealed by one or several of the tests employed, streptococci were found in 77.2 per cent, when the blood agar plates were streaked with sediment. Blood agar plates inoculated by the usual dilution method were about equally effective. Microscopic examination of films prepared from whole milk and from milk sediment revealed the presence of streptococci in only 3.8 and 8.9 per cent of the samples, respectively.

Microscopic examination of films prepared from incubated milk proved to be the most effective of the 6 methods in detecting the presence of streptococci responsible for bovine mastitis. This method revealed the

* In practice it is not necessary that cultures of streptococci of bovine origin be examined for ability to hydrolyze sodium hippurate, unless the culture is sufficiently hemolytic to suggest that it may be *Streptococci pyogenes*.

TABLE II

DETECTION OF STREPTOCOCCI IN FRESHLY DRAWN MILK SAMPLES

Method Used		*Diseased Quarters* † *Per Cent of Samples Yielding Streptococci*	*Healthy Quarters* *Per Cent of Samples Yielding Streptococci* *
Blood agar plate	Whole milk-streak	60.8	1.1
	Sediment-streak	77.2	2.5
	Standard dilution	76.0	0.7
Microscopic examination	Direct	3.8	none
	Sediment	8.9	none
	Incubated milk	98.7	13.5

* Saprophytic streptococci and diphtheroids producing streptococcus-like colonies on blood agar plates.
† Quarters affected with chronic streptococcic mastitis.

presence of streptococci in 98.7 per cent of the samples collected from animals affected with chronic streptococcic mastitis. Unfortunately, about 13.5 per cent of the samples from healthy quarters also yielded chains of streptococci by this method.

SIGNIFICANCE OF THE FINDING OF STREPTOCOCCI IN INCUBATED MILK

Of 360 samples of unincubated milk used in the comparative tests, 50 failed to yield colonies of streptococci on the blood agar plates, but revealed streptococci by the direct microscopic examination of the incubated samples. Information on the significance of demonstrating streptococci in these samples was obtained by comparing the finding of streptococci with other laboratory evidence of mastitis, and by isolating and identifying the streptococci in the incubated samples. The results are given in Table III.

Thirty of the 50 samples showed no other evidence of mastitis either at the time or immediately following the test. Cultures obtained from these samples were identified as saprophytes. Three other samples that showed no other evidence of mastitis at the time of the test, were from quarters that gave evidence of mastitis 2 weeks later, when cultures obtained from these quarters were identified as *Streptococcus mastitidis* (Group A). Microscopic examination of incubated milk revealed the presence of streptococci in 16 samples that gave other evidence of mastitis, but no colonies of streptococci on blood agar inoculated with the samples before incubation. Seven of the 16 samples were from recently infected quarters,

TABLE III

SIGNIFICANCE OF THE FINDING OF STREPTOCOCCI IN INCUBATED MILK

Number of Instances	*Number of Quarters*	*Laboratory Evidence of Mastitis* *2 Weeks Preceding Test*	*At Time of Test*	*2 Weeks Following Test*	*Usual Type of Streptococci Isolated*
50	30	0	0	0	S
	3	0	0	+	A
	1	0	+	0	S
	7	0	+	+	A
	9	+	+	+	A

and 9 from quarters known to have been affected with chronic mastitis for some time. Cultures from these quarters were identified as *Streptococcus mastitidis* (Group A).

SUMMARY

The data presented confirm the opinion of others [5, 6, 7, 8] that the common cause of infectious chronic mastitis is a fairly well defined species or type of streptococcus, easily differentiated from *Streptococcus pyogenes* of human origin. A plan is described for differentiating *Streptococcus mastitidis* (Group A) from weakly pathogenic and saprophytic streptococci of bovine origin.

Microscopic examination of incubated milk samples was found to be the most effective of 6 methods used in detecting shedders of *Streptococcus mastitidis* (Group A). As saprophytic streptococci may occasionally be found in incubated samples from healthy quarters, the significance of the finding of streptococci in incubated samples from healthy quarters, in the absence of other evidence of mastitis, or during the first 2 and last 4 weeks of the lactation period, can be determined only by isolation and identification of the streptococcus found.

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Maternal Mortality

. . . Unhappily, we are not in the same fortunate position with regard to the maternal death rate; that is to say, the deaths of mothers in connection with confinement. Confinement is a natural and normal process in which women are concerned in fulfilling the most important function of their lives, namely, providing the future generation. Childbirth is not a disease and should be free from death and danger; but in England and Wales, out of every 1,000 births, there are 4 deaths of mothers arising from pregnancy or confinement, and unfortunately this figure is not showing any decline. The figure 25 years ago was 3.87. It is appalling to think that 4 women in every 1,000 lose their lives in performing this natural function. The general death rate, as I have shown, has gone down by more than one-third since 1875; during the present century, the infant death rate has been reduced by nearly two-thirds; but the maternal rate has, in fact, shown an increase. This situation causes great concern to all interested in the well-being of women and small children.—James Fenton, M.D., Public Lecture to the South African Health Congress, *J. Roy. San. Inst.*, May, 1936, p. 644.

Diphtheria Immunization*

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THE most important question in diphtheria immunization today is whether or not alum precipitated toxoid is proving to be the satisfactory one-injection immunizing agent which preliminary work promised it would be. In answering this question a table has been made of the available figures on the use of alum precipitated toxoid (Table I). The results listed are from the use of single injections. They are analyzed to show the percentage immunized, the interval before the re-Schick, and the reactions from the alum precipitated toxoid. The results of McGinnes, *et al.*[3] and of Newitt[7] are especially interesting for the information they give on the durability of the immunity resulting from a single injection of alum precipitated toxoid. We must conclude from the results available that a single injection of alum precipitated toxoid is at least as potent in changing Schick positive children to the Schick negative state as the usual 2 or 3 injections of a non-precipitated toxoid with a potent preparation, and probably superior to the 3-injection toxin-antitoxin routine. Our ultimate approval of alum precipitated toxoid must now await upon proof that it is just as effective in conferring resistance to actual exposure to diphtheria.

The next important question is when should the Schick test be used? The consensus of opinion seems to be that if the immunizing is done in the most important age group, the preschool children, a pre-Schick is unnecessary. However, additional evidence has been presented during the last year by Greengard and Bernstein[8] which would tend to obligate the use of the Schick test in the infant under 9 months of age, because they find that the passive immunity received from the mother and responsible for the high percentage of Schick negative individuals at 6 months of age will interfere with active immunization with toxoid, leaving the Schick negative infant susceptible as soon as its passive immunity wears off. Whether or not this would apply as well to alum precipitated toxoid immunization is a question which only research can answer. As for the post-Schick, it would at first glance seem unnecessary to use it in the routine mass immunization of children after such a good immunizing agent as alum precipitated toxoid. Certainly from a public health standpoint the 5 or 10 per cent remaining unimmunized would have a negligible effect on the diphtheria incidence. We feel, however, that abandonment of the post-Schick test is ill advised, not only because of its value as a check on the immunizing agent and the technic, but even more important, because the result of the post-Schick test gives us the answer to that unavoidable question, "Why has

* Read at a Special Session on Diphtheria Immunization of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

my child, who has been injected, contracted diphtheria? "

As long as diphtheria is present in the country we will always have diphtheria in injected individuals not rendered Schick negative. The very fact that they resisted the immunizing treatment classifies them with those most likely to contract the disease. From the standpoint of the individual, as well as for the good repute of immunization practice, it would seem imperative to be able to say whether or not the immunizing treatment has been successful.

Further studies on other immunizing agents against diphtheria have appeared in the literature during the past year. Studies have been reported by Silberschmidt [9] on immunity in animals 16 days after the first inhalation of diphtheria toxoid. Leach, Jensen, and Póch [10] in studies on immunization with a single injection of purified toxoid plus aluminum hydroxide, found that all of 148 children studied gained in antitoxin following its use. Ramon and co-workers,[11] working on ointment immunization against diphtheria, showed that the skin must be broken by shaving or rubbing to obtain success. Bunney [12] has reported on intradermal injection with a toxoid-toxin mixture and found a doubling of the final antitoxin level from all immunizing procedures tried if as little as 0.5 L_f's of toxoid was contained in the pre-Schick test material. Although some of these may prove worthy of being used with or in place of alum precipitated toxoid, we do not believe available data warrant their recommendation for routine use

TABLE I

RESULTS OF IMMUNIZATION WITH ALUM-PRECIPITATED TOXOID

Age Group	*No. of Individuals*	*Pre-Schick Test*	*Interval Between Imm. Injection and Re-Schick*	*Per Cent Immunized*	*Reactions*	*Ref.*
Children	98	Pos.	8 weeks	94	No severe reactions	Wells, *et al.*[1]
School age	99	Pos.	2-6 months	94	Same as ordinary toxoid	Graham, *et al.*[2]
School age	86	Pos.	2-6 months	91	Same as ordinary toxoid	Graham, *et al.*[2]
444 preschool	613	Not done	2-4 months	97	Same as ordinary toxoid	Graham, *et al.*[2]
Children	1,765	Pos.	2 months	94	Same as ordinary toxoid	McGinnes, *et al.*[3]
Children	347	Pos.	1 year	95	Same as ordinary toxoid	McGinnes, *et al.*[3]
Preschool	264	Pos.	8 weeks	100	No moderate local, no general reactions	Shrifrin [4]
School and preschool	301	Pos.	8 weeks	94	2 moderate local, no general reactions	Shrifrin [4]
Adults avg. age 40 yrs.	196	Pos.	8 weeks	58	7% moderate local and general reactions	Shrifrin [4]
380 preschool, 208 school age	588	Pos.	63 days	98	Same as ordinary toxoid	Newitt [5]
4-19 years	53	Pos.	60 days	94	1 severe, 5 moderate general reactions	Keller & Leathers [6]
4-19 years	23	Pos.	42 days	100		
School and preschool	123	Pos.	1 year	89	Same as ordinary toxoid	Newitt [5]
Children	197	Pos.	2-3 months	100		Baker & Gill [7]
Children	1,400	Not done	2-3 months	99	0.05% abscesses	Baker & Gill [7]

at the present time. It might be well to point out here, however, that the work of Underwood,[13] and of Parish, Edin, and Wright[14] on the incidence of diphtheria caused by the virulent gravis strain of the diphtheria organism emphasizes the need of striving for the highest level of circulating antitoxin. They show that the usually accepted immunity level of antitoxin is not sufficient to protect against infection with this strain. In other words, in choosing immunizing procedures it may not be enough simply to choose those that convert a reasonable number of Schick positive children to the Schick negative state.

Other reports of interest in diphtheria immunization are those of Kuk Choun[15] on the relationship between the nutritive state of the animal organism and its response to active immunization. He found that animals on a diet rich in vitamins and receiving plenty of sunlight responded best to injections with a diphtheria antigen. The work of Tsen[16] on immunization against diphtheria and scarlet fever with the combined toxoids gives additional information on this important possibility. Further work needs to be done in both these fields, and their importance is obvious.

It might be pertinent in closing to point out some of the things which as yet we do not know about alum precipitated toxoid. We do not know the importance of the potency of the product—for instance, whether or not it makes any difference if the product is just good enough to pass the National Institute of Health requirements or is several times as potent. We know little about the stability of the immunity resulting from its use as compared with that resulting from the use of the unprecipitated toxoid given under the same conditions and at the same time. We have little available data as to the value of the product in the older age groups and can make no recommendations as to the dosage or interval to be used in these groups. We have little data on the stability of the product under ordinary conditions of storage and handling. We do not know if it will actively immunize 6 month old babies who have retained passive immunity from their mothers. Further carefully controlled studies are certainly needed on these phases of diphtheria immunization.

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Determination and Estimation of Residual Chlorine*

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RESIDUAL or free chlorine may be estimated either by the starch iodide method, by titration with thiosulphate, or colorimetrically with orthotolidine. Each method has its drawbacks, but of the 3, orthotolidine is the most sensitive, lends itself most readily to field use, and requires but 1 manipulation; namely, the addition of the indicator which produces a color varying in intensity with the quantity of chlorine present.

Thiosulphate cannot be used in water or sewage works practice because it is not sensitive to the residuals encountered in such work which usually run below 1.0 p.p.m. Starch iodide was used when chlorine was first introduced, but gradually gave way to orthotolidine after its standardization in 1913 by Ellms and Hauser[1] and its popular development by Wolman and Enslow[2] in 1919. Recent research indicates that a starch solution preserved with zinc chloride and used without acid at lowered temperatures may be very useful in distinguishing false residuals due to nitrites or manganese from true residuals.

The difficulty of preparing fresh standards consisting of known amounts of chlorine with each test prompted the preparation of permanent standards by Ellms and Hauser from potassium dichromate and copper sulphate. These standards were adopted by the American Public Health Association as the official standards for the determination of residual chlorine with orthotolidine. Certain discrepancies have been found and commented upon by Muer and Hale,[3] and by Adams and Buswell,[4] but the values given in the latest (1933) edition of *Standard Methods of Water and Sewage Analysis* of the A.P.H.A. are the values accepted by the profession.

Prior to the 1933 edition of *Standard Methods* the tube length for the matching of the developed color with the standard was not mentioned. This omission has caused considerable confusion among many workers, some of whom proceeded to match the colors in containers varying all the way from the original 300 mm. depth to 30 or 40 mm. When commercial comparator sets appeared on the market, complaints were received of their supposed inaccuracy, many of which were explained when it was found that the dichromate standard made for a 300 mm. depth had been compared through a 13 or 26 or 30 mm. depth with a liquid or glass standard which had been compensated for just this thing.

This mistake may be pardoned when one considers the large number of workers using the test who have had little, if any, technical training. It is only natural the average person in charge of a small water plant would assume

* Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

that if he cut down the standard and solution containing orthotolidine proportionally, he would get comparable results. This would be true of 2 chlorine solutions or 2 dichromate standards of the same strength, but it is not true of dichromate standards and the yellow color of orthotolidine in the presence of chlorine, because both colors are not of the same character: that is, they do not have the same absorption bands.[5]

This may be better understood when we remember that the reason we see green, red, etc., is because the object observed absorbs the colors other than those seen. Thus a red object absorbs the colors on the violet end of the spectrum, reflecting only the red. Likewise, blue objects absorb the red rays, reflecting only the blue.

In orthotolidine work solutions are compared and light is transmitted rather than reflected. This alters the picture of reflected light, for each molecule of dye stuff in solutions absorbs certain percentages of light, transmitting the rest. Thus the number of molecules in a solution governs the amount of light that passes. As an example, "if a 1″ depth of solution passes 70 per cent of the light, a 2″ will pass 70 per cent of 70 per cent, or 49 per cent. Likewise, a 1″ solution twice as strong will only transmit 49 per cent. In either case the light ray has twice the number of molecules in its path."[6]

FIGURE 1

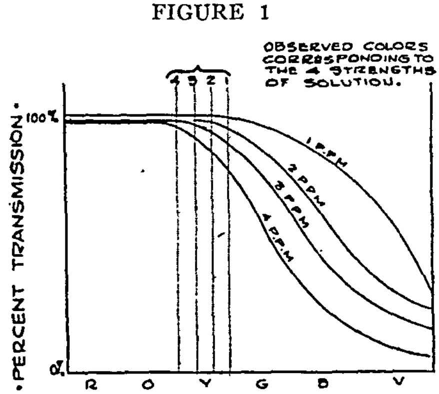
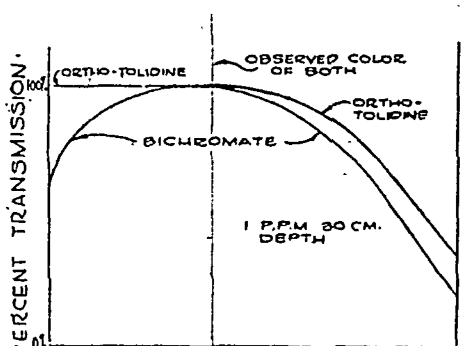


Figure 1 shows how the apparent color of various strengths of color of orthotolidine in the presence of varying amounts of chlorine shift when viewed through the same depth.

It is to be noted how the color shifts from the greenish yellow toward red as the concentration goes up.

The spectrophotometer reveals the following curves (Figure 2) for orthotolidine and for dichromate solutions at 30 cm. depth. It is to be noted they are quite similar but not identical, though the average color is the same. The copper sulphate in the permanent standard absorbs reds. Since there is no counterpart to this absorption in the orthotolidine color, this accounts for the difference.

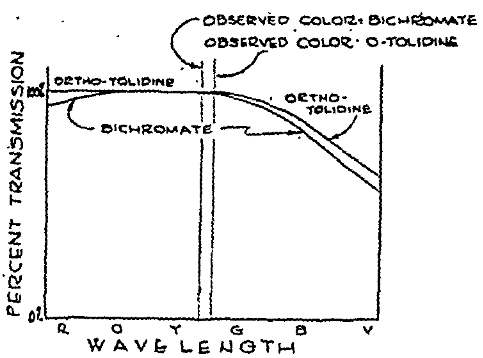
FIGURE 2



When these same solutions are compared at a 3 cm. depth, we get the effect portrayed in Figure 3.

Both solutions here appear lighter and more green than at the 30 cm. depth, but they no longer match. This is because the permanent standard has had an increase in transmission at the red end which pushes the observed color of this standard nearer this end. The orthotolidine color did not move in this direction because it already had 100 per cent transmission of color at that end of the spectrum.

FIGURE 3



While the curves shown in Figure 3 are not strictly accurate in all details they do portray why permanent standards must be compared with orthotolidine color at the 300 mm. depth unless corrections for these differences are made as they are in all commercial comparator sets.

Other difficulties encountered in the determination of residuals include the color of the tubes, the character of the light, cleanliness of the glassware, position of the tubes when comparing, and even the speed with which comparisons are made.

When the long tubes are used for comparison, the color of the glass may at times make a difference as great as 100 per cent, particularly in the lower values on the order of 0.01 p.p.m. to 0.20 p.p.m. The shades usually run from a light blue-green through a reddish brown to one that appears almost black. The light blues or greens appear to give the best results; the browns making matching difficult.

North daylight is best and even then when very accurate results are desired, days when the sun is alternately obscured should be avoided. A slightly overcast sky will give best results. Very consistent results may be secured by using an artificial daylight lamp and lens both day and night for routine work.

Position of the tube is very important. When close readings are desired, a higher and lower standard should be held on either side of the unknown and their position should be shifted frequently.

One should not look at the tubes for any length of time because the eye soon becomes fatigued in respect to color with the result that the shades may blend resulting in the hopeless confusion of the observer.

Reference to cleanliness of glassware may seem out of place, but I have seen false residuals produced by the solution of manganese from the pores of tubes by the HCl in the orthotolidine reagent.

Compensation for color or turbidity is of course impossible when the long tubes are used. This necessitates either going to one of the commercial sets or making special standards for use in bottles adjusted to a shorter observing depth.

There is little need to discuss here the effect of interfering substances, such as manganese, iron or nitrites on the test, since those subjects have been adequately gone into by R. D. Scott in the *Journal of the American Water Works Association,* May and September, 1934, and in the February, 1935, issue of *Water Works & Sewerage,* and by the writer in the *Journal of the American Water Works Association,* July, 1935.

It is perhaps sufficient to say that nitrites up to 0.1 p.p.m. cause errors of less than 0.01 p.p.m.[7, 17] but above 0.1 appreciable error will result while manganese in almost any quantity will give a false residual and should always be taken into account.[8, 9, 10] Iron in the ferric state, and especially when combined with organic material, may cause appreciable errors.[11, 12] Hulbert,[17, 18] Berliner,[19] Braidech,[20] and Hedgepeth,[21] have all noted the effect of nitrites in water on orthotolidine, but the effect of nitrites in sewage on the test has been given little attention.

Field experience indicates that they give little trouble here for false residuals have seldom been noted in sewage even where large amounts of nitrites were present.

In general, when the yellow color of orthotolidine is abnormally slow in developing or is off shade, one should suspect false residuals. Before this happens, of course, the water should be checked for presence or absence of interfering substances, and corrective measures taken.

Buswell and Boruff [13] in 1925 indicated that temperatures between 20° and 35° C. have little effect on the final readings, but that the readings will become progressively lower or progressively higher above and below these values and experiences in the field have checked these results. This leads to the conclusion that it might be well if all orthotolidine readings were made at a uniform temperature of about 20° C. When the temperature of a water falls below that point it can be readily raised without loss of chlorine by placing the sample in a warm water-bath for a few minutes. Some operators place the samples over radiators for a period which experience has taught them is sufficient to raise the temperature to the required point. It is quite probable that some of the taste difficulties encountered during the cold months may be due to chlorine in excess of the amount measured when the tests have been conducted on unwarmed water.

We are often asked for a method of determining between chlorine and chloramine residuals. To date, no entirely successful test has been evolved. Scott [14] mentions the use of the methyl red test which does give an indication of the presence or absence of chloramines, but this test is seldom wholely relied upon.

Attention has been drawn several times to the blue or bluish green color produced when the tube in which the yellow color of chlorinated orthotolidine has been produced is emptied and refilled with chlorinated water. This off-shade is probably due to the action of minute traces of orthotolidine which have stuck to the glass. Since the acidity of this adhering indicator is not strong enough to change the pH of the water appreciably, the blue or blue-green appears. It has been reported that a few exceedingly alkaline well buffered waters have produced these green or blue-green shades with the regulation amounts of orthotolidine. The effect is usually due, however, either to the addition of insufficient amounts of orthotolidine to 100 c.c. of water or the addition of the regulation amount of orthotolidine to a large volume of water. Either procedure might produce the same results.

Estimation of residuals in sewage is particularly difficult due both to turbidity and color. Turbidity may be easily compensated for by placing a second container of sewage having no orthotolidine ahead of the standard and a bottle of distilled water ahead of the unknown. But color is a different matter. Yellows or blues, for instance, may give greens of difficult matching qualities while the acid may discharge the color or at least weaken it to the point where a match can no longer be made with the standard. This difficulty may be minimized by adding 10 per cent HCl in equivalent quantities to the orthotolidine to the compensating bottle.

This method was used with considerable success at the Saw Mill River Treatment Plant of the Westchester Sanitary District where a nearby run works periodically discharged bright reds, greens, and browns into the sewer a few hundred feet ahead of the plant. Investigation proved that chlorine demands of the dyes were not as high as originally suspected but that the HCl

in the indicator altered the dyes to such a point that the residual could no longer be read.

Davis[15] of the New York State Department and Green[16] have noted that strong daylight will affect the sensitivity of orthotolidine to free chlorine. At Little Falls, N. J., the residual usually remains very consistent day after day. On occasions, however, they would fall very suddenly without warning and for no readily apparent reason. Careful checks demonstrated that the orthotolidine had suddenly lost its sensitivity to free chlorine. It is now standards practice at that plant to renew the test solutions every 6 weeks.

Orthotolidine itself may darken with age. This does not ordinarily alter its sensitivity but does result in a poor looking solution which has the psychological effect of throwing doubt on the test. This is caused by impurities in the salt. A sufficiently pure product to give a water clear solution is now commercially available so that recrystallization does not have to be resorted to.

It seems hardly necessary to speak of time of contact between addition of orthotolidine and time of reading, but I have had so many inquiries along this line that there must still be some question about it. Not more than 10 minutes for chlorine nor more than 20 minutes for chloramines is necessary for production of maximum color. Literally hundreds of samples were run at Bound Brook, N. J., a short time ago to settle this question. Readings were taken at 5 minute intervals and temperatures noted at each reading. This was not a laboratory experiment but was carried out on a natural river water under natural conditions as to weather, temperature, etc. The chlorine and ammonia rations were the only things changed. Very few of the chloramine samples required more than 20 minutes for full production of color, and the majority of the samples containing chlorine alone reached their maximum color intensity within 10 minutes. Practically all of the samples showed a fading of color at the end of 30 minutes.

Unless a water is severely polluted with sewage or industrial waste, the yellow color of chlorinated orthotolidine will usually last for at least 30 minutes unless exposed to direct sunlight. In sewage work, however, the color may flash up to a maximum within 5 minutes and then fade rapidly. Under such circumstances no time should be lost in making the determinations, and the maximum color produced in so far as we know will record the actual residual present. The reason for the flash of color and quick fading is probably due to the action of the chlorine on the organic matter which releases fresh reducing matter with the resultant decolorization of the orthotolidine.

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The "Cure" of Leprosy

WE take no exception to the claims of the bacteriologists that when a patient recovers from a disease such as leprosy or tuberculosis it is impossible to prove that the causal organism has been eradicated or that there is no possibility of relapse. That relapses are frequent must be acknowledged by any physician who handles cases of leprosy. But we protest against the weakness of the clinicians who have allowed their bacteriologically-minded brethren to steal from them a perfectly good word, clothe it in the garments of a heretic, and then burn it at the stake.

We maintain that "cure" is a good old word, far older than the science of bacteriology, quite devoid of the meaning that is now sought to attach to it, and not in the least deserving the obloquy into which it has come. Webster, and such other dictionaries as we are able to consult, give us as the meaning of cure: to restore to health. Neither here nor in its cognate use—the cure of souls—is it for a moment suggested that no future fall from health, physical or spiritual, is guaranteed.

It is evident from every possible reference that what cure implies is a restoration to previous functional health, so that the victim is again able to take his place in society as a normal member thereof. Now our bacteriologically minded friends want to give an entirely new meaning to this word, and thanks to the weakness of their clinical brethren they are fast doing it. Cure is a good word, a kindly word, and it deserves no such harsh treatment.

. . . One sometimes wonders whether the fact that the pessimist sees so many fewer cures than the optimist is due not merely to a different, possibly more scientific, attitude of mind but also to the psychological effect that different types of minds have on patients. At any rate, we hereby lodge again the claim of the clinician to the restoration of the word "cure" to its proper significance, and invite our colleagues to find some other word implying that the patients are bacteriologically clean.—James L. Maxwell, Editorial, *Internat. J. Leprosy*, 3, 3:351–352 (July-Sept.), 1935.

Problems in Rural Registration*

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ACCORDING to the census of 1930, 44 per cent of the population of the United States is rural. In fact, 27 of the 48 states contain more than 50 per cent rural population. Therefore, it seems timely that a discussion should be had at this time concerning problems in rural registration especially since it is generally known that registration problems invariably center in the rural areas.

There may be some question about the fitness and capacity of the individual selected to prepare this particular paper, but I guarantee that his state contains all known problems in rural registration—and to a greater extent and in a wider variety than any other state in the Union. For nearly 12 years, I have wrestled with these problems and cudgeled my brain continually for methods of solution. We have managed to stay in the United States Registration Areas for Births and Deaths, which I consider a great feat under the circumstances.

What may be listed as the leading problems in rural registration?

First, and foremost, *illiteracy:*

1. In the general population
2. Among midwives, undertakers, rural doctors and rural registrars

Second, lack of medical attention, lack of funeral service due to poverty.

Third, inaccessibility—poor roads—scattered population.

Fourth, unreasonable laws and regulations.

ILLITERACY IN THE GENERAL POPULATION

The census of 1930 revealed that 4.3 per cent of our population is illiterate, and that the illiteracy percentage among the rural population is practically twice the figure prevailing in the urban sections. Unfortunately, we find most of the illiteracy banked in certain geographical divisions, namely, the South Atlantic, the East South Central, and the West South Central, all comprising 17 states.

Among these states, however, we find a comparative minimum of this condition in Delaware, Maryland, District of Columbia, West Virginia, and Oklahoma. On the other hand, a high percentage of illiteracy is recorded for 2 mountain states, New Mexico, and Arizona.

In the geographical divisions just mentioned, the census shows that the percentage of illiteracy among native born whites is 3.7, 5.0, and 2.6, respectively; whereas illiteracy among the Negroes, who constitute a large proportion of the population, is 19.7 per cent, 22.0 per cent, and 17.0 per cent. In the States of Arizona and New Mexico the high percentages of illiteracy are due to the Mexican and Indian components of their population. In Texas the census takers found a

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million and a half Mexicans and Negroes—over 25 per cent of the total population of the state.

Mississippi is classed as 83.1 per cent rural, being exceeded only by North Dakota as a rural state. A fraction over 50 per cent of the population of Mississippi consists of Negroes, and 88 per cent of these are rural. The rural Negro in the United States was credited with 22.4 per cent illiteracy in 1930.

ILLITERACY AMONG SPECIAL CLASSES CONCERNED WITH REGISTRATION

1. *The Midwives*—In Mississippi there are nearly 3,000 so-called midwives, most of whom can neither read nor write. They attend 50 per cent of the births in the state; and of course a great majority of these births occur in the rural areas. If this state of affairs does not constitute a problem in rural registration, what does it constitute? Fifteen or 20 other states in the Union are faced with the same situation in lesser degrees.

2. *Undertakers*—The country undertaker usually develops more or less by accident. He is ordinarily a furniture or hardware dealer to begin with; then he puts in a small stock of coffins; finally, he buys a second-hand hearse and begins to bury the dead. He is afflicted with ruralitis anyway, and it is hard to inculcate in his mind the importance of registering deaths.

3. *Doctors*—The rural doctor as a rule means well, and many of them are well educated and up-to-date, but it is a fact that most of the old-timers and uneducated groups cling to the rural districts from necessity as well as choice. In the early days of registration they were principally the group that scoffed at birth registration as a piece of foolishness. Going further than this, I am convinced that few professors of obstetrics in the United States teach medical students the necessity and importance of birth registration.

4. *Local Registrars*—Our rural registrars can be blamed for many shortcomings. The majority of them are not systematic. They lose many birth and death records that have been entrusted to them for mailing to the central office. Many of my local registrars are downright ignorant, and I am confident that all of them in other states are not college graduates.

LACK OF MEDICAL ATTENTION—LACK OF FUNERAL SERVICE—DUE TO POVERTY

Possibly we are all aware of the surprise exhibited by physicians and health officials at one result of the recent depression.

When money became scarce back in 1931 and health appropriations were cut in half everywhere, we all put forth our big argument that people would die like sheep, and epidemics would stalk throughout the land. The truth of the matter is during the depression we had the lowest death rates ever reached.

But, lack of medical attention, however it may affect the death rate, does interfere severely with rural birth and death registration and with tabulations on causes of death. In certain sections, from 10 to 15 per cent of deaths occur without medical attention, and these do not include sudden deaths. Also, thousands upon thousands of births occur without medical attendants.

One of the ardent desires of my life is to see the day come when every man, woman, and child will be able to secure adequate medical, surgical, and hospital service when necessary. Lay literature and medical literature have teemed with articles on this absorbing theme for the past 3 years. Very few advocate State Medicine. I am not advocating State Medicine. In my state almost any humble Negro or

humble white man or any member of his family, can be buried decently, and how? Just by paying $1 a month for the whole family into the treasury of a burial association. The humble citizen saves money—the burial association makes money. My own family consisting of myself, wife, and numerous children, belong to a burial association run by a first-class undertaker, and I pay only $1 a month.

The president of an eastern medical university, in addressing a gathering of the American College of Surgeons, made the following suggestions for universal medical attention.

1. That those in easy circumstances should take care of their own medical and surgical service.

2. That the great middle class should pay associational dues to guarantee them proper protection.

3. That the indigent portions of the population should be treated at public expense.

I believe if you were to search the world over, you could not devise a more sensible scheme for rendering universal medical service, and it does not mean State Medicine.

There would result a marvelous improvement in rural birth and death statistics if there were medical attendants in all cases.

I have already more or less appraised the rural undertaker, but it is a fact that hundreds of deaths occur in certain sections of the United States wherein no undertaker whatever officiates. A large percentage of these deceased persons do not even enjoy the luxury of taking their final repose in manufactured coffins.

INACCESSIBILITY—POOR ROADS—SCATTERED POPULATION

Poor roads and inaccessibility of homes constitute major difficulties in successful registration in the rural areas. However, during the past 10 years rural roads have been vastly improved, even in Mississippi. Doctors think nothing of making calls 25 miles away, and undertakers travel over 100 miles in burying the dead.

The density of population in the states varies from 0.8 per square mile in Nevada to 644.3 in Rhode Island, and even to 7,852.7 in the District of Columbia, which of course means the City of Washington. Mississippi's density is 43.4 as compared to 41.3, the national average.

UNREASONABLE LAWS AND REGULATIONS

Most of our registration laws were passed in a different age from that in which we live today. In fact, anyone who is now as old as 40 has lived in two distinct eras of the world's history. Therefore, if our registration laws were founded on conditions existing 25 years ago, and have not been revised to fit modern circumstances, we are groping in the dark, particularly in rural sections.

It is not my purpose to criticise the laws and regulations that govern registration in any other state. However, I shall detail two radical departures made in Mississippi from the uniform registration law and will ask you to be the judges as to the wisdom of such changes.

1. Nearly 2 years ago we suspended the burial permit, except for deaths occurring in towns of 1,000 or more population and except for bodies shipped into other states.

2. During the present year, we are consolidating districts to the extent that in over half of our 82 counties we have only 1 registrar to the county.

Marked improvement in registration of births and deaths has been noted in our state as a result of these departures from the time-worn requirements that have been binding for nearly a quarter of a century. These changes have been made to fit modern conditions.

We feel that there would be just as much reason to require a physician to make out a birth certificate and file it and get a permit to attend a labor case as there is justification in requiring an undertaker to make out a death certificate; file it; and obtain a burial permit. Why should state boards of health take it upon themselves to give permits for burial of the dead? * If there is any suggestion of foul play, then the registrar refers the case to the coroner. We are not crime officials. Requiring a permit in rural areas in this day and time works an unnecessary hardship on the undertaker and the family. The family may be 20 miles from the undertaker. The doctor who treated the case may live 15 or 20 miles away, and the registrar may live 10 miles in another direction. The registrar or the doctor, or both, may not be at home when the undertaker calls. In such a case, the undertaker must travel nearly 75 miles just to file a completed certificate and obtain a permit.

We give our undertakers 5 days from date of death to file the death certificate. Our rural certificates are now in better shape and a greater percentage are being filed than heretofore.

As stated elsewhere, doctors now travel many miles in their practice, and it is nothing unusual for undertakers to transport the dead 100 miles or more; so we have become convinced that 1 registrar in a county simplifies registration for that political division, and lessens the work of the clerk or clerks in the central office who keep accounts with the registrars. The monthly reports of the county registrars in Mississippi have exceeded our expectations.

As proof of the fact that suspending the burial permit in Mississippi, except for deaths in towns of 1,000 or more people, has benefitted registration, our figures show that for the year 1934, the first year the permit was suspended, we had an increase of 1.4 per cent regular death certificates—that is, certificates filed on time. Also, we had a 9 per cent decrease in delayed filing of death certificates. This includes not only certificates filed by undertakers, but by families of deceased persons where no undertakers were employed. In fact, a large percentage of burials are done in Mississippi without the assistance of undertakers. The total number of death certificates filed in Mississippi during 1933, the last year that permits were in force, was 21,617; the total filed during 1934, the first year the burial permit was suspended, was 21,786.

Now that the leading obstacles to good registration in rural areas have been considered, you may very naturally expect some recommendations for their removal, or at least for their amelioration.

It is an undisputed fact that ignorance is the greatest handicap to progress; but I am glad to state that illiteracy is gradually dissipating, as shown by official figures. In all classes of our population the percentage reduced from 6.0 to 4.3 between 1920 and 1930. The percentage in the white race decreased from 4.0 to 2.7, and illiteracy in the Negro race came down from 22.9 to 16.3 per cent.

Furthermore, one must study and plan various and sundry schemes for appealing to the less educated. High sounding phrases and arguments on the value of statistics do not get very far with the illiterate. The greatest educational force we have had on the value

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* Although the Council of the Vital Statistics Section expressed its disagreement with the view that the use of the burial certificate was unjustified, publication of this paper was approved by the Council for purposes of discussion.

In a supplementary letter, the author writes: "I realize that in a majority of states, it would not be best to suspend the burial certificate. It may not be the best policy in some of the southern states."

of registration is government compensation to so-called disabled veterans.

Another potent aid to registration is the necessity of proving the age of a child first entering school. While this is now required in many localities, each state should make such proof mandatory. A photostat of the birth certificate, or the Census Bureau Certificate, or other certificate of birth registration has great educational value, especially in the rural areas.

The matter of inaccessibility of rural homes is being solved by highway improvement and the general use of fast moving vehicles. In addition, we observe that this class of population is being reached through wider circulation of the daily press and through consolidation of public schools.

Our local registrar fee law was amended a few years ago so as to reward registrars for prompt reporting. Any registrar in Mississippi who does not live in a town of 5,000 or more population receives $.40 for each birth and death certificate filed on time, and only $.25 for each delayed certificate, whether the delay is the fault of the registrar or of some other person. This change in the fee law proved to be a wonderful stimulus for prompt registration in the rural areas.

I should not like to close without calling attention to the fact that every state registration department should have a field man. Unfortunately, I cannot say that I have one, but I have had one occasionally, and do know the great value of such an employee. There is no doubt but that a certain amount of prosecution is essential in this work. The field man is the proper individual to check the work and to prosecute where such a proceeding would obtain the best result.

Dr. J. G. FitzGerald to Make International Study of Methods of Teaching Preventive Medicine

DR. J. G. FitzGerald, Dean of the Faculty of Medicine, Director of the School of Hygiene and of the Connaught Laboratories, University of Toronto, has been invited by the Rockefeller Foundation to make a study of the methods at present employed in the teaching of Preventive Medicine to undergraduates in medical schools.

It is anticipated that the study will occupy a period of 1 year commencing September 15, 1936. Dr. Charles Edward Smith of the Stanford University Medical School, San Francisco, will assist in the undertaking. University Medical Schools in the United States and Canada, the British Isles, and in European countries will be visited in the course of the survey.

Dr. FitzGerald is to resign as Dean of the Faculty of Medicine, University of Toronto, June 30 next. He will be given leave of absence by the Governors of the university for the necessary period and will, it is expected, return to the University of Toronto in September, 1937, as Director of the School of Hygiene and of Connaught Laboratories.

Treatment of Undulant Fever*

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THIS report is a summary of results obtained from the treatment of 100 cases of undulant fever with Brucellin. This disease has a tendency to become chronic following the acute stage, so that the chronic phase may be the more serious condition from a standpoint of the general health of the patient. It was therefore necessary to obtain data on the actual effectiveness of the therapeutic agent in bringing about complete recovery rather than to appraise it on the basis of a rapid termination of the acute stage. A large percentage of the cases were checked many months after cessation of the specific treatment.

Clinical diagnosis of undulant fever is not easy particularly in the chronic type and in children. The presence of specific agglutinins in the blood may furnish confirmatory evidence but cannot be relied upon, since the blood of many individuals shows Brucella agglutinins, sometimes in high titer, and a negative test does not always exclude this infection. A further aid is the intradermal test with Brucella allergin. This test does not distinguish between sensitization as the result of a previous infection and infection at the time the test is made. A new preparation which is a nucleoprotein suspensoid known as "Brucin" is now being studied. Further laboratory evidence may be obtained by measuring the Brucella opsono-cytophagic power of the blood. This test may also be used as an index of recovery from infection. Of the 100 cases studied the agglutinin titer was either negative or less than 1 to 50 in 33 patients of whom 22 were children under 11 years. In 85 cases, an attempt was made to obtain a blood culture. This was successful in 16 instances. Of the 16 cultures, 7 were *Br. abortus*, 5 were *Br. suis* and 4 were *Br. melitensis*.

It is difficult to estimate the value of any therapeutic agent for undulant fever. In many cases symptoms are of short duration; or if the disease is recognized early and the patient put to bed, uneventful recovery may follow in a few weeks. Recovery after specific treatment from an acute attack is not comparable to recovery from the distinctly different chronic disease. Only general data are presented for this series of cases.

In 70 cases the duration of symptoms before treatment with Brucellin was less than 121 days. Fifty-one, or 73 per cent, recovered within 22 days after the first injection, 18 or 26.1 per cent required more than 22 days for recovery, and 1 or 1.4 per cent failed to respond. In 30 cases the duration of symptoms before treatment was more than 121 days. In this group 17, or 56.6 per cent, recovered within 22 days after the first injection, 10, or 33.3 per cent, required more than 22 days for recovery, 3 failed to re-

* Abstract of a paper read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 10, 1935.

spond, 2 of these cases terminating fatally.

If one excludes the 6 cases that failed to respond to treatment and the 2 that succumbed, it will be found that the average duration of illness per case before treatment was 159.3 days. The average duration of illness per case after treatment was begun was 18.3 days.

It is believed that an intradermal allergic test made with standardized allergin and a proved opsono-cytophagic test are indispensable aids to diagnosis and that the latter test is valuable for determining recovery.

Standardization and Application of Different Preparations of Diphtheria Toxoid*

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A VARIETY of media is used for the preparation of diphtheria toxin. In the Research Laboratory of the New York City Department of Health a powdered, purified extract of fresh veal and beef heart muscle, with 2 per cent proteose peptone, 0.5 per cent salt, 1 per cent sodium acetate, and 0.3 per cent maltose is used for making toxins for immunizing horses, unmodified toxoids, and toxoid flocculi extracts. A medium prepared by boiling fresh veal with 0.5 per cent glacial acetic acid in distilled water, with subsequent additions of proteose peptone, salt and maltose is considered more satisfactory for the preparation of toxoid alum precipitate since this precipitate is more homogeneous and smoother than that made from the first mentioned medium. Irrespective of the medium used, the toxins formed are alike in kind. When sufficiently potent they can be converted in toxoids by the addition of 0.4 to 0.5 per cent of a 37 per cent formaldehyde solution, followed by incubations at 38°–40° C. for 4 to 6 weeks.

Since the introduction of diphtheria toxoid for immunization, numerous attempts have been made to enhance its potency with the object of decreasing the dosage, using 1 or 2 in place of 3 doses, and eliminating both systemic and local reactions. The result is the toxoid alum precipitate. In older children and in adults severe reactions have been obtained, so that the New York City Department of Health uses this only for babies and children of preschool age. For school children crude toxoid in 2 doses is used. Reactions may be practically eliminated by the use of toxoid antitoxin flocculi extract, but many more flocculating units are required for antibody production than is true for the toxoid alum precipitate, probably due to the too rapid absorption of the extract. The toxoid antitoxin flocculi extract is used in adults only.

Unmodified toxoids, properly stored and preserved have an immunizing value proportional to the flocculating units. When phenol is used as a preservative, however, the antigenic value decreases

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* Abstract of a paper read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

although the number of flocculating units remains the same. In general, the Ramon flocculation test is sufficient for initial titration of toxoids and is being used not only for titrating toxins, toxoids, and their derivatives, but also for crude diphtheria antitoxins. Discrepancies between this and the more laborious guinea pig method have been encountered in testing concentrated and purified toxoids and antitoxins, but some of these may be overcome by careful attention to the technic of the flocculation test.

Office of Public Health Education Established

THE U. S. Public Health Service has announced the establishment of the Office of Public Health Education. It is under the care of Assistant Surgeon General L. H. Thompson, Chief of the Division of Scientific Research. The purpose of this new Division is to carry out certain experimental studies in health education.

Its initial activities are: the training and instruction of young commissioned officers of the Service; special instruction for educators, health officers, and sanitarians from state health departments or from foreign countries; to make studies of educational methods employed in health agencies and other fields of education; studies in mass adult education through the use of the radio; making permanent records of available material; and the issuance of a bulletin to carry current health information primarily for the personnel of the Service.

The bulletin has been called "The Health Officer," the first issue of which appeared in May, 1936, and the second in June. It is intended that a monthly digest of current public health education be issued. The first two issues are pleasing and instructive. They contain a number of well written reviews of books.

We cannot help thinking that our government should be able to put out a better looking bulletin. The two issues received are of different sizes, one with a colored cover, and one in black and white. One is apparently mimeographed and the other multigraphed. At any rate, both of them are produced by some process apart from printing. Some of the reviews of books are signed and some of them have only initials. We believe that the value of a review depends largely on who wrote it.

We wish the new department all success, and the name of its Director assures us of its efficiency. The bulletin is also useful, but we hope that it will improve in its appearance.

EDITORIAL SECTION

IMMUNIZATION AGAINST DIPHTHERIA

EXCEPTING smallpox vaccination, perhaps our most important success in the prevention of disease by specific immunization has been with respect to diphtheria. No measure of this class, other than smallpox vaccination, has been more generally accepted or has resulted in a larger measure of success in the prevention of illness and death.

Immunization procedures against diphtheria have been singularly free from undesirable complications, when one takes into consideration the number of immunizations which have been done. This is particularly true of diphtheria toxoid, the agent now most extensively employed, whether given as the plain product or in the modified form usually spoken of as alum precipitated toxoid. The practical application of the latter in this country we owe largely to the genius of the late L. C. Havens, Director of the State Laboratory of Alabama. In the earlier stages of the use of this preparation a considerable number of local abscesses followed the injection of certain lots, but so far as known, no serious permanent injury has resulted. A very small proportion of abscesses continue to follow the use of certain batches, and research workers engaged in the testing of this preparation have not devised thus far a wholly satisfactory means for detecting by laboratory tests those batches likely to be followed by abscess formation, if indeed these undesirable local sequelae are actually due to any inherent property of certain preparations of alum precipitated toxoid.

There was a long interval between the establishment of the theoretical basis for immunization against diphtheria and the practical application of the procedure, but once the latter had been undertaken, thanks largely to the inspiring leadership of William H. Park, health officers and physicians rapidly extended its use, so that now a very considerable proportion of children in the period of greatest susceptibility to diphtheria have been and are being immunized.

The question as to which of the two preparations should be used, the plain toxoid or the alum precipitated toxoid, has been an open question for some years, sometimes bordering on the nature of a controversy; and it is feared that too often sight of the merits of the issue has been lost in efforts of proponents to popularize one or the other of the preparations. Generally speaking, European and Canadian workers have adhered to the use of the plain toxoid, being influenced doubtless by the high authority of Ramon. The plain toxoid has been largely replaced by the alum precipitated material in the United States, but nowhere else in the world has the latter made great headway.

Perhaps one of the reasons for the controversial situation arises from the fact that there is a lack of a generally accepted accurate method of standardization of the potency of any of the diphtheria prophylactics. While we have methods for evaluating their activity, they are by no means as exact as those for evaluating the potency of diphtheria antitoxin. Then, too, there is no uniformly accepted procedure as to the size and number of doses of the material used or as to the spacing between doses when more than one dose is given. In practical application the health officer would do well to bear in mind the particular age group in which susceptibility to diphtheria is greatest. Generally speaking, this is the group between the ages of 2 and 7. Perhaps it would be a good rule for ordinary public health practice, including public school work, to say that it is hardly profitable to immunize against diphtheria after 10 years of age.

Unquestionably the most important problem has been to secure immunization of the preschool child. Different health authorities have approached the problem in various ways. In one large city the follow-up based on birth records is so thorough that it is an exceptional child which does not have a diphtheria prophylactic before the age of 2 years. In many communities it is customary to leave the interests of the preschool child largely to the family physician, who it is feared in many cases has been rather negligent in failing to recommend this valuable life-saving procedure to his clientele.

Perhaps one of the most important problems is the degree and duration of the immunity produced by diphtheria prophylaxis. An ideal prophylactic would be one conferring an immunity in a large proportion of children lasting until natural immunity has developed. Few groups have been observed over a long enough time, and with sufficient care, to enable us to determine to what extent the various prophylactics have met this criterion. Obviously this is to a considerable extent the essential point of the whole program.

An outstanding variation in actual practice is with respect to the utilization of the Schick test for the detection of susceptibles and for the determination of the effectiveness of the immunization procedure. Although the Schick test is accepted as a practical means of measuring results in large groups of individuals, it is now recognized that it is not an infallible indication of the immunity status in the individual case. The preliminary Schick test has been abandoned generally in the younger age groups, but we see no justification for failing to do Schick testing after the injections have been given and a sufficient time allowed to elapse for the development of immunity. In some communities there has been a considerable degree of disappointment and uncertainty as to where the fault lay when diphtheria has attacked a fairly large number of children thought to be immune by reason of a series of inoculations, but not subjected to the Schick test after completion of the procedure.

THE LABORATORY SECTION

ORGANIZED in 1899 as "The Laboratory Section of Bacteriology and Chemistry" under the chairmanship of W. H. Welch, with Wyatt Johnson as the guiding genius, the Laboratory Section has been active throughout the 36 years of its existence, and never more so than at present. To many members of the Association, "Laboratory Section" and "Standard Methods" are essentially synonymous, and it is quite true that the major interim interests and activities have been centered about the formulation of procedures for use in public health laboratories. Little attempt has been made to interpret the results obtained by these laboratory methods because the Section has felt that so many factors other than laboratory data are involved that the formulation of "standards" would not only be difficult but unwise.

The oldest of the laboratory procedures is *Standard Methods for the Exemination of Water and Sewage,* now in its 8th edition. Chemical, microscopical, and bacteriological methods are included, for potable waters, sewages and effluents, streams, industrial wastes, and boiler waters. It is now a joint publication of our Association and the American Water Works Association, but a number of other national societies have coöperated, as well as many individuals. It is the hope of the Section that this manual will always represent the best American practice, and to this end a standing committee is continuously at work on the preparation of new editions. The methods are regarded as authoritative and intended for the guidance of properly equipped laboratory workers rather than for those inexperienced in chemistry or bacteriology. The book is not to be regarded as a substitute for adequate professional training.

Standard Methods of Milk Analysis has gone through 6 editions and the 7th is in preparation. These methods have the same status in the milk laboratory as the water methods have in the water laboratory. The Laboratory Section has been concerned chiefly with the bacteriological examination, since methods for chemical examination have been so well formulated by the Association of Official Agricultural Chemists which are included in our volume. It is proposed to extend the usefulness of *Standard Methods of Milk Analysis* to the more general field of dairy products.

At various times the Section has proposed other standard laboratory procedures, such as those for examination of disinfectants, air, or oysters. The formulation of methods for testing air has been transferred to the Industrial Hygiene Section, those relating to disinfectants have been withdrawn, but those for the examination of oysters and other shellfish are now being revised. In this, as in many reports submitted by the Laboratory Section, representatives of other Sections serve as members of the committee and are of great aid to those working, perhaps at times, too closely in the laboratory.

The success of "standard methods" in certain special interests of the public health laboratory has resulted in an extension of activities to include diagnostic methods ordinarily regarded as belonging to such laboratories. For 2 years a large committee has been at work on these. This is not really a new departure, since the Section has, for a number of years, discussed a series of able reports on the Wassermann technic and finally adopted a standard procedure. Reports have already been received dealing with such diagnostic methods as those for amebic dysentery, enteric fevers, undulant fever, meningitis, whooping cough, tuberculosis, and streptococcus infections. We hope to gather in a single volume

the most frequently used procedures and to publish them in such a form that new methods can be easily added and old ones brought up to date.

With other Sections of our Association and other organizations, the Laboratory Section has coöperated by appointing representatives familiar with the particular problems involved—for example: with Committees on Milk Pasteurization, Swimming Pools and Bathing Places, Waterways Pollution, Biological Stains, Bacteriological Examination of Foods.

With increasing and widening interests of the Section, it became evident that some coördinating group was desirable to systematize these activities. A Coördinating Committee was appointed to have general charge of all committees interested in the various laboratory procedures for which standardized methods are desirable, and to pass upon the procedures before their submission to the Section for approval. At present this committee consists of 5 members, of whom 1 is the Secretary of the Section; but flexibility in the set-up allows for expansion when needed. A recent proposal has been for a committee to consider methods employed in the care and use of laboratory animals. The various committees dealing with standard methods are appointed by the Coördinating Committee and consist of chairmen and referees on the various topics in which the committee is interested. This scheme has been operating satisfactorily for 2 years.

The various Section activities, combined with basic responsibility for the program of the Annual Meeting has thrown a burden on the office of the Secretary of the Section greater than was ever intended, and it is only a question of time before his duties will be too heavy to be handled by a busy man as a side issue to this regular occupation. Although the chairman and councilors have coöperated in planning the Annual Meeting, the bulk of the responsibility has fallen on the Secretary. The Laboratory Section can well be proud of the increasing number of papers submitted and the increased attendance during the past several years. The variety of subjects presented has been rather great, and ranging through the preparation and standardization of laboratory reagents and biological products, discussions of new laboratory procedures applicable to public health problems and the use of biological products in immunization, to reports of laboratory studies on the cause of diseases.

With no intention of over-emphasizing the importance of the laboratory, it must be stated that much of the work of a well organized health department is dependent fundamentally on its laboratory. The epidemiologist, the sanitary engineer, the school physician, the nurse, and the various clinics not only can utilize but need the laboratory, and it is the function of the Laboratory Section to see that efficient service is rendered.

In August Journal

Community Public Health Nursing in the Philippine Islands—*George C. Dunham, M.D.*

Lead Pipes as a Source of Lead in Drinking Water—*G. N. Quam and Arthur Klein*

Administrative Practice in the West—*J. Rosslyn Earp*

PUBLIC HEALTH EDUCATION*

Where Is the Big Bad Wolf?—The big bad wolf, public opinion, who so recently has had press and radio cowed at the very thought of naming "social diseases" by their rightful names, seems to have vanished from most communities. Even as a flapping scarecrow to frighten off insistent health workers fewer and fewer editors and broadcasters will continue to claim protection against stupid readers and listeners.

Departmental Health Education Adviser — Department of Health, Seattle, Wash., has a Health Education Adviser. The bearer of the title, Dr. A. S. Baker, sent the following answer to a question as to the nature of his job:

> This office is quite new, having been in existence only about a year. The job is, briefly, to build up a public health library, starting with a room full of very old volumes, pamphlets, etc., answer correspondence from the public with reference to health matters, operate a mimeograph printing outfit, write up and broadcast radio talks or invite others to do so, take care of press information, check any health information matter before issue and generally correlate health education material issuing from the several divisions of the department.

What Has Been Accomplished?—A newspaper clipping is headed: Advertisers Hail Truth Movement. Celebrate 25th Anniversary of Campaign to Wipe Out Fraudulent Practices.

The accompanying note from the fellow worker who sent us the clipping reads:

> I would be glad to know how far the campaign for Truth in Advertising has really proved effective. Judging from the advertisements for quack medicines that I see in some papers, there has been no reduction in that kind of advertising although it is probable that it does more harm than any other form of advertising.

Taking daily newspapers as a whole there has been a tremendous gain over years gone by, but are there exceptions in your community?

How about the weekly newspapers? Foreign language and other class newspapers?

What have health workers done about it? What might they do about it, directly or indirectly?

An Idea for a Parade?—A city health officer wrote:

> There is to be a parade through the business part of the city with floats depicting the work of the various city departments. We wonder if you have any suggestions as to what subjects to show on a float about the Department of Health.

There have been successful parades for teaching health ideas or giving information, but we have heard of none in which the work of the health department was presented. The ideas we sent in answer to the letter were too feeble to reproduce here.

The time is past for helping the inquirer, but others may benefit from any experiences or suggestions which might be sent to the editor. There is likely to be an increasing number of historical and other public civic events in which the department or other health agency is expected to participate.

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

Taken for Granted in Illinois—As reported by B. K. Richardson, Chief of Public Health Instruction, Illinois Department of Health, Springfield:

> Out here on the prairies the "press" picks up on its own initiative, news items concerning venereal diseases and uses the word "syphilis" with no more hesitancy or hedging than it uses the word "tuberculosis" or "diphtheria."
>
> To illustrate: Recently, in a circular to local health officers, the State Department of Public Health commented on the greater reported incidence of syphilis this year as compared with last. Although not released as a news item, the Associated Press picked up the information and used it as a wire story.
>
> The leading down-state newspapers as well as the *St. Louis Post-Dispatch* carried the story. The *Alton Telegraph* and the *Cairo Citizen* based editorials on it. I heard a preacher in one of the leading Springfield churches refer to the story from his pulpit, using the word syphilis.
>
> Whenever the subject is pertinent to the discussion, the word syphilis is used with no hesitancy by members of the State Department of Public Health in radio broadcasts given over various Illinois stations. No objection whatever has ever been voiced by the studio managers.

Enclosed with the above was a mimeographed memorandum addressed "To Local Health Officers Only" which emphasized the current situation in the state. Also a photostat sheet reproduces 5 news clippings and one editorial in all of which syphilis was mentioned in headline or text.

Health Promotion Through Education—Under this title Dr. Iago Galdston addressed the West Virginia Health Conference. Dr. Galdston urged:

> We must reshift our emphasis from man's environment and its inimical elements, to man himself, to his habits, to his practices, to his personal hygiene—we must become teachers again, to teach man how to live.
>
> Health education in America is rooted in prohibitions and taboos, but we must abandon the technic of taboo and cultivate that of affirmation.

He sketched the integration of health education in the activities of the private medical practitioner, the voluntary health organization, and the public health organizations.

Address the author at 2 East 103d St., New York, N. Y., for copy of the reprint.

Why Memorize a Broadcast?—In June, 1936, *Journal,* under "The Martin Family Broadcasts" we copied the interesting and practical material prepared by Dr. and Mrs. Bauer for *Hygeia* concerning the series of episodes which will appear in that magazine.

We wish to question the suggestions for reproducing the episodes in the form of "make believe" broadcasts. Our suggestion is that the stage be not darkened, and that the lines be not memorized for presentation without script in hand. The process of broadcasting continues to fascinate many people. And the simulation of broadcasting carries over some of that interest. And the use of manuscript by the cast behind a real or imitation microphone does away with many problems of actors and acting. All depends upon the rendering of the lines, with attention to acting only as certain of the cast may need the dramatic action to enable them to give the lines effectively. Thus production is simplified, and the audience gets something of the studio atmosphere.

The statement from *Hygeia* that any medical or health organization "is granted permission to produce this material, provided no admission charge is made" might be amplified. On application to the authors, 535 North Dearborn St., Chicago, Ill., permission will be given for paid admission on a modest royalty basis. *We hope that some health groups will explore the possibility of giving one or more of the episodes with paid admissions.* Success in getting a paid audience for health education material would be a

real achievement, and a distinct advance in getting attention for health messages. Is it possible that we are giving away too much or, rather, that there are groups which would respond to projects which called for cash expenditure by the beneficiaries?

Get some Junior League or other group to put on a paid health broadcast?

Our Neighbors to the South—Always we have been delighted to show at the Annual Meeting of the American Public Health Association specimens of health education material from our members and readers in other countries.

This year, meeting in New Orleans, it would be especially fitting to have considerable representation of health education materials of all types from national and local health agencies in all the countries around the Gulf of Mexico and further south.

Posters for hanging, small items mounted in a portfolio or scrapbook, larger pamphlets and reports to place on a table—all could be used to advantage.

Later an address for sending such material direct to New Orleans will be supplied. In the meantime please write to the editor of this department of the *Journal* who is chairman of the health education headquarters.

We hope that brief annotations in English will be supplied because unhappily so few health workers in the United States and Canada can read any of the Latin American languages.

To Our Readers in All Lands—Our major group of readers, in Canada and the United States, have few opportunities for learning about the health education materials and methods of other countries. The editor of this department of the *Journal* is a volunteer not on the staff of the A.P.H.A., and is not in a position to write personally to our readers around the world to request their coöperation. So please take this as a formal request and a cordial invitation to send samples of your materials for educating the public, together with some paragraphs telling in simple manner the methods you follow.

An added favor, please! If the material comes from a non-English speaking country will you please send brief notes explaining the nature of the material and the nature of the health message it carries. And kindly get your brief manuscripts put into English for the sake of the poor editor who may find even greater difficulty in getting translations done.

Also please note what we say elsewhere to "Our Neighbors to the South" and accept it as an invitation to readers in any land. If you issue a periodical could you extend these invitations to your readers?

The Road of Life—Recently the Seattle Department of Health responded to one of those short notice requests (or demands) for a display in connection with a meeting. Dr. A. S. Baker reports what they did about it:

> We made a very good picture on cardboard with cut-out figures and water colors, using one of the members of our staff to do the work. This was hung on a wall over a table on which a supply of pamphlets was placed.
>
> The picture was of a hill upon which was shown life's road. Upon this road the cut-out figures were placed: a baby and, in order, a preschool child, a school child, an adolescent, a young adult, an adult at about 45 years, and an elderly person obviously in good health.
>
> Along the road was placed the "Fence of Health Protection" labeled opposite each figure in the order given above, "Proper Diet," "Diphtheria Protection by Toxoid," "Smallpox Protection by Vaccination," "Typhoid Protection by Inoculation," "Regular Physical Examinations," "Recreation," "Rest."

In the sky above the hill was printed " Protection of Health on the Road of Life."

This " Road of Life " guarded by the " Fence of Health Protection," skirted a precipice at the bottom of which was a swamp. For a very quickly gotten together thing, it seemed quite effective.

In the Philippines—Save for the illustrations *The Health Messenger* might well be issued as a popular health monthly by any state in the country. But the *Messenger* comes from the Bureau of Health, Department of Public Instruction, Manila, P. I. Miss Josefa Llanes-Escoda is editor and educational secretary of the bureau.

April, 1936, is a "National Hospital Day" number. One page pictures a hospital building, with smaller sketches labeled laboratory, dispensary, personnel, operating room, etc. Text: " These activities cost a great deal of money. Support your hospital." Elsewhere a simple sketch: a dollar in the center; curved lines from the dollar to hand made lettering to read: light 4¢, laundry 4¢, wages 13¢, salaries 31¢, etc. There are no dividing lines in the dollar for the different items. The point is made by the larger numerals for the items in cents.

Miss Llanes-Escoda would appreciate receiving samples of health education material.

A Y.W.C.A. Health Program—What the Public Health Committee of the Central Branch, Y.W.C.A., Chicago, Ill., is trying to do is outlined in *Womans Press,* 600 Lexington Ave., New York, N. Y. June, 1936. *20 cents.*

The committee is " bearing in mind the necessity of concentrating on few topics and reaching more of the membership."

A " study of physical defects and conditions prevalent among women in touch with the Health Education Department " provided the subject matter for the educational program.

Health Education in May, 1936, Journal—For the possible convenience of students and writers, as well as health agency staff members, we review here references to be found in the May, 1936, issue of the *Journal* which have a bearing on health education or which may have special value to workers in health education.

In " Child Health and the Elementary School," by Phair, note the situation of " the average child " as stated in last paragraph, page 455, and the whole of page 456.

In " Comparative Value of State Districts and County Districts as the Basis of Local Health Organization," by Godfrey, note two paragraphs on " propaganda " on page 466.

In " Integrating Mental Hygiene," by Patry, note the last paragraph on page 478 which states the necessity for combined professional and community efforts in the successful development of mental health.

On page 479 is announced the request of State and Provincial Health Authorities that the Children's Bureau assume responsibility for the annual " May Day–Child Health Day " which for so many years has been sponsored by the American Child Health Association.

See the symposium on " Consumer Demand for Vital Statistics," by Round, Doull, Eliot, Bolduan, and Thompson, and Thompson (pages 489–505).

Under " Health Code on National Basis " (page 511) the 5th heading is: Education and publicity . . .

Under " Relationship of the Public Health Nurse to the Part-time Local Health Officer in Communicable Disease Work," by Arnstein, this question is raised:

What responsibility has she in reporting

cases, in selection of cases to be visited in education of the community?

See announcement of *Educational Abstracts* (page 527) which includes a section on "Health and Physical Education."

"New Orleans, The Convention City" (pages 540–545) may help some readers to decide not to miss the October meeting in that city.

Another group of members of the Public Health Education Section is announced on page 549.

"Summer School Courses in Public Health" are listed on pages 552–555.

"Conferences and Dates" are announced on pages 559–560, and "Meetings of Affiliated Societies and A.P.H.A. Branches" on page xii.

Numerous reprints from the *Journal* are listed on page xii.

Health Education in June, 1936, Journal—References of interest to health educators are noted below.

"For an Amended S. 5" (page 585), quoted from *Printer's Ink,* states the case of a group of organizations on the current "Copeland Bill."

"Set-Up and Budget for Public Health Education," by Hiscock (pages 593–596), was one of the important papers presented at Milwaukee.

"Integration of the School Health Program with Community Health Education," by Blanchard (pages 625–628), also comes from the Milwaukee program.

Reports on educational qualifications of engineers and of sanitarians (pages 629–633) are contributions to the study of professional preparation in which health education should have a continuing share.

Most important in this issue of the *Journal* is the editorial on "Work for the Editor" (pages 636–637). Addressed to those who will write papers for the New Orleans meeting, much of the editorial has a bearing on the writing of popular health education material.

"In Books and Reports" see "American Chamber of Horrors" (page 650).

See "For All to Read" under "A Selected Public Health Bibliography With Annotations" (page 653).

"Health Conservation Contests for 1935" are reported on pages 655–656.

Another fine list of new members of the Public Health Education Section is given on page 658.

"Scientific Exhibits in New Orleans" (page 659) is an important announcement.

September 1 is stated as the closing date for acceptance of applications for Fellowship to be acted upon at New Orleans (page 659). The Public Health Education Council would be glad to receive Fellowship applications from a number of the Section's members.

HONORABLE MENTION

To Departamento Nacional de Higiene, Republic of Colombia, Bogota: for an annual report with a 4 page index.

BOOKS AND REPORTS

Why Keep Them Alive?—*By Paul De Kruif, in collaboration with Rhea De Kruif. New York: Harcourt, Brace,* 1936. 293 pp. Price, $3.00.

Here at last is a popular glorification of public health activities. In the course of this fervent treatise, De Kruif devotes much space to the child welfare and antituberculosis work conducted in Detroit under the direction of Health Commissioner Henry F. Vaughan and his able corps of assistants. Other eminent sanitarians, including Drs. W. H. Park, L. I. Dublin, S. McC. Hamill, B. Marquette, H. C. Sherman, and Haven Emerson, also come in for mention in various parts of the book.

The 10 chapters, written in the author's usual ebullient style, but with somewhat more inspiration than usual, present the thesis that many children in this country are underprivileged, malnourished, poverty-stricken, and generally forgotten; that they are worth saving; and that skillful efforts now being undertaken by a group of competent and devoted health workers should be supported and enlarged.

In addition to the chapters on tuberculosis and on child hygiene generally, there is excellent material on nutrition, emphasizing the "rediscovery of milk's amazing array of virtues," and there is a most interesting chapter on the Dionne quintuplets.

This well printed book by a popular writer turned sociologist should be of interest not only to all members of the public health profession, but should yield many useful facts which health workers can employ to advantage in their endeavors to educate an apathetic public, and should aid in awakening the people themselves to a realization of some of the more urgent public health problems. JAMES A. TOBEY

Great Doctors of the Nineteenth Century—*By Sir William Hale-White, M.D. London: Edward Arnold and Co.,* 1935. 325 pp. Price, 15s net ($5.00).

This is not only a delightful book to read, but it tells us of great men with whose history all interested in medicine should be familiar. Most of the great doctors selected are probably well known to the average medical graduate in this country, though it must be confessed that in spite of the influence of Osler, sufficient emphasis is not laid on medical history in our medical colleges. Some names, like those of Jenner, Cooper, Bright, Simpson, Stokes, Manson, Lister, and Ross will be recognized immediately. Some, like Hughlings Jackson, will be known to neurologists. Sir John Simon is probably comparatively little known except to sanitarians. He was Lecturer on Pathology at, and on the surgical staff of, St. Thomas's, but acquired fame as a pioneer in sanitary science.

The author gives a sketch of each man considered before pointing out the work which made him famous.

We do not like to quote the hackneyed phrase, "Lives of great men all remind us," etc., yet there is one feature so outstanding in this book that we cannot refrain from doing so. Many of these great men came from large families, poor in this world's goods, had a severe struggle to obtain

their education and to get started in the profession in which they made such brilliant records. In this there surely is a lesson for many of the young men of the present day in America, who, owing to economic conditions as well as to competition, find it hard to get a start. There are notable instances, rare today—at least in this country—of a freedom from jealousy and an overwhelming desire to see results accomplished rather than to gain credit. This is brought out particularly in the history of Sir Samuel Wilks, who is said to have preferred that Hodgkins be known rather than himself.

In a book of such general excellence, it is hard to select one chapter over another. For readers of this *Journal*, however, we believe that the histories of Edward Jenner, Sir John Simon, Sir Patrick Manson, and Sir Ronald Ross will be of particular interest, though while saying this, it is recognized that the vast majority of those who take up this book will read every chapter, and we are not blind to the fact that the work of Lord Lister in advocating and perfecting antiseptic surgery, for example, has had an enormous influence in promoting the acceptance of the great truths taught by Pasteur which underlie public health of today.

In the days in which these men lived, formal lectures were the rule. Bedside teaching was conducted in a very different manner from that of the present. No one better fitted than the author to write on these great doctors could have been chosen. Many of the men of whom he writes were on the staff of Guy's or St. Thomas's Hospital, to the former of which the author is the consulting physician, and of which he is a distinguished alumnus. He was probably taught by some of the men of whom he writes, or by their former students.

The book is admirably printed and made up. There are very few mistakes, and only one liable to lead to misunderstanding. On page 267, Lister is compared to himself instead of to Liston. The whole book is delightful reading, and we trust that it will increase the love for medical history for which Osler worked so many years and in which he has left in this country some distinguished successors.

MAZŸCK P. RAVENEL

The Art of Leadership—*By Ordway Tead. New York: McGraw-Hill,* 1935. 308 pp. Price, $2.50.

The most successful health officer must be a leader—of his staff, of public health thought in his community and of professional and lay groups in his community with respect to their public health activities. This phase of his activities is not an important part of his training either in schools of public health or schools which prepare for this training. He must depend therefore for the present on such books as this for guidance.

The author performs a useful service in analyzing the art of leadership and pointing out its superiority over bossing as a method of permanent achievement. There is a chapter on conference leadership which should be read by everyone who has occasion to preside over any group meeting of three or more people. That a high degree of physical health is a valuable asset in leadership is implicit in many of the author's statements.

HOMER N. CALVER

Health and Human Progress—*By René Sand. New York: Macmillan.* 278 pp. Price, $3.00.

This is a learned, interesting and stimulating essay on social progress, past, present and future. The author ranges widely in space and time and the title of the book does not adequately describe its scope. His thesis is that medicine—" sociological medicine "—

must save the race. He does not convincingly demonstrate why he elects this particular branch of learning to achieve this noble end, nor why he chooses this designation for the curriculum of improvement. He says,

> Sociological medicine demands the provision, by *collective measures* of favourable labour conditions, good housing, decent wages, generalized insurance, sanitary, technical and educational services, to be completed by the *individualized action* of medical and social case work.

Most of this is "good medicine" but it is better described as social planning or social hygiene, as that term is used in the author's country.

The necessary, important and increasing part which medicine must play in the further social development of the race is discussed thoroughly and intelligently with a background of world-wide knowledge of national medical and social situations. These glimpses of conditions and achievements in many countries alone recommend the book as required reading for students in this field. Much of it will interest the general reader but it is essentially a textbook, and includes a most excellent and lengthy bibliography. The index is not adequate for the wealth of material treated.

There are few men in the world who have had such opportunity for the study of social conditions in all parts of the world as the author. Nevertheless, he tends to confuse medicine in its relation to social progress with the relation of social progress to public health. His preoccupation with the problems of medical relief for the sick poor and sickness insurance tends to crowd out consideration of such fundamental programs as those for water purification, insect eradication, and milk pasteurization, which are so essentially social in their concept and execution, with tremendous influence on the *mass* prevention of disease and therefore proper for prime treatment in a book on health and human progress. Though much space is given to the problems of medical economics in the United States and elsewhere, the rôle of epidemiology in the prevention of crowd disease is not discussed. Snow's classic studies on cholera are not even mentioned. HOMER N. CALVER

Annual Report of the Surgeon General of the Public Health Service of the United States for the Fiscal Year 1935—*Washington: U. S. Government Printing Office,* 1935. 158 pp. Price, $.75.

This report is always of interest. Unfortunately, it is generally many months late. Although it is dated October 15, 1935, it did not come to hand until January, 1936. It concerns the state of public health for the calendar year of 1934.

The death rate for the year was 10.9 per 1,000—0.4 per 1,000 or 3.8 per cent higher than for 1933. It is, however, lower than for any recorded rate before 1932. The birth rate has increased to 17.1 per 1,000 against 16.6 for 1933. This means that there were 93,975 more births for 1934 than for 1933, an increase of 3 per cent. The infant mortality rate is higher than for 1933. In 1934, there were 59.9 deaths under 1 year per 1,000 live births, against 58.2 for 1933. Again, the rate is lower than for any year prior to 1932.

The tuberculosis death rate for 1934 was 56.2 per 100,000, the lowest ever recorded by the Public Health Service. Typhoid fever and diphtheria had exactly the same rate, 3.3 per 100,000.

The outbreak of poliomyelitis in California in 1934 has already been noted. For 1934, there were 6.4 cases of the disease per 100,000 population reported. Late in the fiscal year of 1935, outbreaks occurred in North Carolina and Virginia, which are de-

scribed in full in the *American Journal of Public Health* for February, 1936. In July, 1934, dengue appeared in Florida and spread to Georgia and Alabama, there being 2,005 cases in Florida, 1,962 in Georgia, and 1,072 in Alabama. The actual number of cases must have been tremendously greater, as dengue is very imperfectly reported.

During the year 1934, 775,000 cases of measles were reported, nearly double the number reported in 1933.

One fatal case of plague was reported in Lake County, Ore., and one non-fatal case in Tulare County, Calif. There were found during that year 197 plague-infected ground squirrels and one plague-infected rat in California.

One of the blots on our record is smallpox, 5,371 cases being reported. This, however, is the smallest number since records have been kept, and 10 states have had no cases.

Our maritime quarantine has been very effective. Quarantine officers of the Public Health Service inspected 15,262 vessels and 1,924,556 persons; 12,482 vessels, 544,255 passengers, and 981,361 seamen were inspected upon arrival at continental United States ports. Of a total of 4,081 arriving airplanes, carrying 34,135 persons, only 2,636 airplanes, carrying 30,249 persons, of whom 1,991 were aliens, were accorded the medical inspections required by law; the remaining airplanes arrived at airports of entry at which medical officers of the Public Health Service are not available for duty.

The certification of water supplies for use on railroads, busses, vessels, and airplanes was continued with the assistance of state health agencies, 95 per cent of the listed supplies being inspected and certified; 58 supplies were prohibited, and 401 provisionally certified.

The study of venereal diseases has been carried on and is not very encouraging. During the year, 254,551 new cases of syphilis and 161,810 new cases of gonorrhea were reported. It is estimated that there are 518,000 new cases of syphilis and 1,555,000 of gonorrhea each year.

The report is an interesting review of health conditions in the United States.

MAZŸCK P. RAVENEL

Mouth Hygiene for School Age Children, Rendered by Several Coöperating Agencies in Cleveland During 1935—*By Harris R. C. Wilson, D.D.S. Cleveland, Ohio: Cleveland Board of Education (privately printed),* 1936. 79 pp.

While this is mainly a report of dental services rendered in the Cleveland schools last year, it might well be used as a textbook for public dental health work. No matter how much one may distrust projects aimed at furnishing the greatest amount of essential dentistry at the lowest cost, the recommendations of a man who has supervised the dental care of a half million school children must be given respectful attention.

Dr. Wilson's plan concedes the impossibility of administering complete dental care to all people, and limits its efforts to fillings in vital teeth only, for children. The service is entirely in professional hands. The cost to the patients is within their ability to pay. The compensation of the dentist is reasonable. The value of such a service to a community is inestimable.

It is impossible for a dentist to read this report without being impressed by the soundness of the writer's observations.

C. F. ELZEA

Introduction to Human Parasitology—*By Asa C. Chandler, Ph.D. (5th ed.) New York: Wiley,* 1936. 661 pp. Price, $5.00.

The announcement of a new edition

of this standard book will be greeted by all students of the subject of which it treats.

The 4th edition was rewritten and rearranged owing to the great advances which had been made in the field of parasitology since the third edition. Since that time the pace has been kept up and again the author has found it necessary to rewrite the book. Extensive changes have been made in the chapters or sections dealing with the spirochetes, amebae, malaria, ricketsias, flukes, Strongyloides, filariae and myiasis. In addition the author states that the prolific work of parasitologists of the past 6 years has made it necessary or desirable to make some change on practically every page. The author also points out that it is necessary to revise his statement, made in the 4th edition, that there was no entirely satisfactory modern textbook on medical entomology, and now gives generous credit to the several which are available.

A book which has reached its 5th edition and which has for so many years been regarded as a standard is certainly above the criticism of the average reviewer. This one will doubtless continue to hold the position it has for so long occupied as a standard.

The printing and make-up are good. There are abundant illustrations which are really illustrative and informative. MAZŸCK P. RAVENEL

The Bacteriological Grading of Milk—*By G. S. Wilson, M.D. London: Medical Research Council, 1935. Spec. Rep. Series, No. 206.* 392 pp. Price, 7s. 6d. net.

Modern methods for the bacteriological grading of milk to indicate cleanliness and keeping qualities may have to be drastically revised as a result of the facts presented in this somewhat formidable document. As a consequence of investigations extending over 3 years, Professor Wilson and his assistants at the London School of Hygiene and Tropical Medicine conclude that most of the present bacteriological methods used for milk are inaccurate and unsuitable. Thus, they condemn the plate count as guilty of very large experimental errors, and they state that the coliform count gives fictitious and misleading results, except possibly for freshly pasteurized milk. Similarly, the sediment test, the leucocyte count, the H-ion concentration, the titrable acidity, the bromthymol test, the keeping quality test, and the laboratory pasteurization test have all been carefully examined and found defective for routine purposes, although occasionally valuable for special uses.

The Breed smear method receives praise as a practical method for rapid examination of milk, and is declared to deserve greater attention than it now receives, at least in Great Britain. As a replacement for all methods now employed, however, the authors suggest a modified methylene blue reduction test, the modification consisting essentially of half hourly inversion of the tubes to keep the fat and microörganisms in a more or less homogenous dispersion. This test is advocated as a simple, inexpensive procedure, having a small experimental error, and suitable for use by relatively unskilled workers who are dealing with large numbers of samples.

Milk sanitarians and laboratory workers will find this book interesting, valuable, and provocative, especially since the experimental work has been nicely, meticulously, and very capably performed. JAMES A. TOBEY

Convalescent Care in Great Britain—*By Elizabeth Greene Gardiner, Assistant Professor and Supervisor of Medical Social Work, University of Minnesota. Chicago: Chicago Uni-*

versity Press, 1935. 163 pp. Price, $1.50.

This is a book which will interest those called upon to make hospital surveys or studies bearing upon the organized care of the sick.

The convalescent, like the chronic case, frequently has little provision made for him, particularly in the smaller centers. Although general hospitals in 1935 had an average bed occupancy of only 64.3 * per cent, the occupancy is not equally distributed for the whole year, so that at times discharges from hospitals have to be made when the patient still needs convalescent, if not regular, hospital care.

* *J.A.M.A.,* Mar. 7, 1936.

Moreover, where convalescent facilities exist, a patient who needs only convalescent care can usually be provided for at much less cost than in a regular hospital. Professor Gardiner has shown how Great Britain compares with the United States in the provision made for this type of patient. Convalescent care in Britain is provided for a larger proportion of hospital cases, the institutions providing the care are, on an average, larger, and on the whole greater pains are taken to see that the institution by location, equipment, and service meets the particular needs of the convalescent case.

A splendid bibliography forms part of the survey. JAMES WALLACE

BOOKS RECEIVED

SOLVING PERSONAL PROBLEMS: A Counseling Manual. By Harrison Sacket Elliott and Grace Loucks Elliott. New York: Holt, 1936. 321 pp. Price, $2.00.

SECURITY AGAINST SICKNESS: A Study of Health Insurance. By I. S. Falk. New York: Doubleday, Doran, 1936. 423 pp. Price, $4.00.

THE BABY AND GROWING CHILD: Feeding and Health Care for Physicians, Mothers and Nurses. By Louis Fischer, M.D. New York: Funk & Wagnalls, 1936. 260 pp., ill. Price, $1.50.

SYPHILIS AND ITS TREATMENT. By William A. Hinton, M.D. (Macmillan Medical Monographs, George R. Minot, M.D., S.D., Editorial Advisor.) New York: Macmillan, 1936. 321 pp. Price, $3.50.

A SURVEY OF PUBLIC HEALTH ACTIVITIES IN HONOLULU, HAWAII, INCLUDING OFFICIAL AND VOLUNTARY AGENCIES. By Ira V. Hiscock, M.A., C.P.H. Chamber of Commerce of Honolulu, Hawaii, 1936. 149 pp., ill.

THE DIABETIC LIFE: Its Control by Diet and Insulin. By R. D. Lawrence, M.A., M.D., F.R.C.P. 9th ed. (London.) Philadelphia: Blakiston's, 1936. 231 pp., 15 ill. Price, $3.00.

HOSPITAL ORGANIZATION AND MANAGEMENT. By Malcolm T. MacEachern, M.D., C.M., D.Sc. Chicago: Physician's Record Co., 1935. 944 pp., ill. Price, $7.50.

HYGIENE AND SANITATION: A Text-Book for Nurses. By George M. Price, M.D. 6th ed., rev. Philadelphia: Lea & Febiger, 1936. 295 pp. Price, $2.25.

FOOD, HEALTH AND INCOME. By John Boyd Orr. New York: Macmillan, 1936. 71 pp., ill. Price, $1.00.

MOUTH HYGIENE FOR SCHOOL AGE CHILDREN, Rendered by Several Coöperating Agencies in Cleveland During 1935. By Harris R. C. Wilson, D.D.S. Privately printed. Cleveland, Ohio: Cleveland Board of Education, 1936. 79 pp.

SOCIAL WORK AS A PROFESSION. By Esther Lucile Brown. 2d ed. New York: Russell Sage Foundation, 1936. 120 pp.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Dietary Fads and Facts—Every health worker who has the least responsibility for influencing public attitudes or ideas should read this excellent article. It is to be hoped that it will be reprinted and made widely available as have earlier health contributions in this remarkable magazine.

ANON. The Wonders of Diet. Fortune. 13, 5:86 (May), 1936.

Preschool Hygiene—A recital of the steps by which Milwaukee progressed from a summer round-up to a year round health program for preschool children.

BRUMBAUGH, E. V. Completing the Child Health Program. Pub. Health Nurs. 28, 5:286 (May), 1936.

Barometric Infant Deaths—Infant mortality rates are a sensitive index of municipal public health *if* the number of births exceeds 500 per year. Less than that number causes too wide a fluctuation. Unusual social and economic conditions may invalidate the index in larger communities.

DERRYBERRY, M., and VAN BUSKIRK, E. The Significance of Infant Mortality Rates. Pub. Health Rep. 51, 18:545 (May 1), 1936.

Proof of the Value of Diphtheria Prophylaxis—Suggesting that the reduction in diphtheria morbidity rates may be due to other factors than our praiseworthy immunization campaigns, the authors call for more studies which will include pre-immunization Schick tests.

LUCIA, E. L., and WELKE, H. F. Trends in the Prevalence of Diphtheria. J. Infect. Dis. 58, 3:306 (May–June), 1936.

Measles Prophylaxis—Reporting the successful use on a county-wide basis of immune globulin in the prevention of measles.

MCGAVRAN, E. G. County-Wide Use of Immune Globulin in the Modification and Prevention of Measles. J.A.M.A. 106, 21: 1781 (May 23), 1936.

Dependent but Well Nourished—Praising the work of relief agencies in preventing malnutrition in school children and adults, the author reviews divers reports on the nutritional status of the American people.

MCLESTER, J. S. Influence of the Depression on the Nutrition of the American People. J.A.M.A. 106, 22:1866 (May 30), 1936.

Hot Weather Hints—Excellent radio advice, but the words are polysyllabic.

OLESEN, R. Care of the Health in Hot Weather. Sci. Month. May, 1936, p. 457.

More Evidence Against Raw Milk—Ice cream containing toxins elaborated by staphylococci originally from a mastitis and transmitted through raw milk was responsible for a food poisoning outbreak.

SHAUGHNESSY, H. J., and GRUBB, T. C. Staphylococcus Food Poisoning. J. Infect. Dis. 58, 3:318 (May–June), 1936.

New Objectives in Public Health—Not sanitation, nor epidemiology, not even the conquest of chronic diseases, but the promotion of health will be the keystone of the administrative program of the future.

WINSLOW, C.-E. A. When Is Public Health? Survey Graphic. June, 1936.

ASSOCIATION NEWS

NEW ORLEANS PROGRAM

THE second meeting of the Program Committee was held in New York on June 5 with representatives of each Section in attendance.

A preliminary scientific program of 2 General Sessions, 3 Special Sessions, 10 Joint Sessions, and 21 individual Section Sessions was approved. A number of special breakfast, luncheon, and dinner meetings was also approved.

The programs will be published in full in the September *Journal.*

Leafing through the tentative outlines submitted to date, a number of important subjects and speakers stand out prominently. Dr. Thomas Parran presents the address of the incoming President. Dr. Henry E. Sigerist, eminent medical historian, is the Banquet speaker. Dr. Thorvald Madsen, Director, State Serum Institute, Copenhagen, Denmark, speaks at the luncheon meeting on Professional Education. The report of the Diphtheria Immunization Committee is presented at another luncheon meeting.

Mental Hygiene is the subject of a Special Session; Mosquito-Borne Diseases another; and Advances in Public Health a third.

The Southern Branch of the Association is sponsoring a dinner session, and the Health Officers are planning another which is entirely a social affair.

There are symposia on syphilis, on food poisoning, on the public health engineer in industrial hygiene and sanitation, on school health education, on eating utensil sanitation, on promotion of birth and death registrations and their interpretation, on milk and dairy products, on enteric fevers, on intestinal parasites, on health publicity and news, on infant and maternal mortality, on municipal engineering problems and activities, and many more.

The papers in the miscellaneous sessions are equally timely and important. Speakers in every case have been selected from among those best equipped to present their material.

The New Orleans program will add to the reputation the Association has been building for itself on the score of distinguished and authoritative Annual Meeting presentations.

Full information about the post-convention tour through Florida to Cuba will be mailed to the membership in the near future.

The Program Committee approved the plans for reception and entertainment submitted by Dr. W. A. McPhaul, State Health Officer of Florida, and Dr. Domingo Ramos, Director of Sanitation, Havana, Cuba.

CLOSING DATE FOR FELLOWSHIP APPLICATIONS

THE Committee on Fellowship and Membership wishes to announce that September 1 is the closing date for accepting Fellowship applications for action at the New Orleans Annual Meeting. Eligible members who desire to apply for Fellowship this year are requested to submit their applications to the committee as much in advance of September 1 as possible.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Dr. Aristides Paz de Almeida, Praia de Botafogo #516, Rio de Janeiro, Brazil, S. A., Assistant in Public Health Administration, Nacional Health Department

George M. Anderson, M.D., State Capitol, Cheyenne, Wyo., State Health Officer

William F. Bushnell, M.D., Elk Point, S. D., Director, Union County Public Health Unit

Herschel G. Cole, M.D., City Hall, Hammond, Ind., Health Commissioner

George F. Cook, M.D., 4 E. Main St., Plainville, Conn., Public Health Officer

H. R. DuPuy, M.D., County Health Dept., Annapolis, Md., Senior Assistant Deputy State Health Officer

Frank C. Genouese, M.D., Patterson, N. Y., Local Health Officer

Victor F. Krakes, M.D., Keeseville, N. Y., Local Health Officer

George W. Mast, M.D., 1258 Agnes Place, Memphis, Tenn., Student, Vanderbilt University, County Health Officer Appointee in Mississippi

William H. Meyer, M.D., 27 Hooker Ave., Poughkeepsie, N. Y., Health Officer

Arthur J. O'Leary, M.D., 601 E. 167 St., Bronx, N. Y., Assistant Sanitary Superintendent, New York City Dept. of Health

Edgar F. Powell, M.D., Broad St., Fishkill, N. Y., Health Officer

William P. Richardson, M.D., C.P.H., Chapel Hill, N. C., Health Officer, Orange-Person District Health Dept.

Clarence H. Sanford, M.D., Tan Lane, Exeter, N. H., Medical Director, Exeter Academy

Jerome B. Trichter, 10 Monroe St., New York, N. Y., Inspector of Foods, New York City Dept. of Health

Gregory J. Van Beeck, M.D., U. S. Quarantine, Rosebank, S. I., N. Y., Surgeon, U. S. Public Health Service

Laboratory Section

George E. Bliven, 36 St. John St., Goshen, N. Y., Laboratory Director, J. F. DeVine Laboratories, Inc.

William H. Dickinson, City Hospital, Columbus, Ga., City Bacteriologist

Manuel Garcia Hernandez, Phar.D., Calle "G" #6, Vedado, Habana, Cuba, Director, National Laboratory, Instituto Finlay

Maurice C. Hall, Ph.D., D.V.M., National Institute of Health, U. S. Public Health Service, Washington, D. C., Chief, Division of Zoölogy

Lee Howard, M.D., 5 Derenne Apts., Savannah, Ga., Pathologist, charge of Clinical Laboratory, U. S. Marine Hospital

Evelyn Huntington, C.P.H., Harland Road, Norwich, Conn., Student and Assistant in Research

J. D. Kabler, 304 Schweiter Bldg., Wichita, Kans., Director, Wichita Clinical Laboratory

Raymond E. Leach, Box 647, Parsons, Kans., Bacteriologist in charge, District Public Health Laboratory #1

Luis Vargas, M.D., Calle de la Escuela Medico-Militar #20, Mexico City, Mex., Medical Assistant, Hygiene Institute, Dept. of Health

Elizabeth M. Wood, 720 E. Cook St., Santa Maria, Calif., Bacteriologist, Santa Barbara County Health Dept.

Sophia Zurett, 373 Grider St., Buffalo, N. Y., Chief Technician, Buffalo City Hospital

Vital Statistics Section

Thomas H. Dickson, Jr., M.D., 156 E. 6th St., St. Paul, Minn., Medical Director, Minnesota Mutual Life Insurance Co.

Besse Gulick, 1420 Maryland, Springfield, Mo., Local Supervisor, U. S. Public Health Service Survey, Linn and Livingston Counties

Joseph B. Irvine, 1426 M. St., N.W., Washington, D. C., Chief, Bureau of Vital Statistics, Health Dept.

Cleo B. Nelson, (Temp. address) 2400–20 St., N.W., Washington, D. C., Director, Bureau of Vital Statistics, Dept. of Public Welfare, Boise, Ida.

Frank P. Strome, M.D., State Dept. of Health, Harrisburg, Pa., Director, Bureau of Vital Statistics

Evald Tomanek, M.D., Dr.P.H., Holeckova 12, Bratislava, Czechoslovakia, Deputy Director of Public Health of Slovakia

Public Health Engineering Section

Gerald E. Arnold, Millbrae, Calif., Water Purification Engineer, San Francisco Water Dept.

Hydrick K. Dickert, C.E., Batesburg, S. C., District Supervisor, Malaria Control, U. S. Public Health Service

Andrew A. Hall, Jr., 1336 White St., Ann

Arbor, Mich., Student—Potential Public Health Engineer

John C. Kucharik, 4953 Elston Ave., Chicago, Ill., Sanitary Engineer, Board of Health

Albert P. Learned, C.E., 4706 Broadway, Kansas City, Mo., Sanitary Engineer, Black & Veatch

Emanuel H. Pearl, 1613 Sabine St., Austin, Tex., District Sanitary Engineer, State Dept. of Health

Evan A. Sigworth, 230 Park Ave., New York, N. Y., Research Engineer, Industrial Chemical Sales Co.

Industrial Hygiene Section

Marion E. Brown, M.D., 921 Canal St., New Orleans, La., Professor of Ophthalmology, Tulane University

William L. Clay, 510 Powers Bldg., Rochester, N. Y., interested in occupational diseases

Warren A. Cook, State Dept. of Health, Hartford, Conn., Chief Industrial Hygienist

Milton H. Kronenberg, M.D., 104 S. Michigan Ave., Chicago, Ill., Occupational Disease Clinic, University of Illinois

Anthony M. Lotowycz, C.P.H., 160 N. 5th St., Brooklyn, N. Y., Assistant Areal Supervisor, U. S. Public Health Service

Food and Nutrition Section

Charles A. Fulle, Jr., 6 Macopin Ave., Upper Montclair, N. J., Nutritional Health Education

Guillermo Lage y Fernandez, M.D., C.P.H., Prado 124 Habana, Cuba, Director, Auxiliar de Investigaciones Cientificas, Instituto Finlay

August J. Pacini, Ph.D., 155 E. Ohio St., Chicago, Ill., Nutrition Research, Pacini Laboratories

Child Hygiene Section

William W. Britt, M.D., 135 Adam St., Tonawanda, N. Y., Medical Supervisor of City Schools

Martha L. Clifford, M.D., C.P.H., State Dept. of Health, Hartford, Conn., Assistant Director, Bureau of Child Hygiene

Vincent Ippolito, M.D., 29 Spring St., New York, N. Y., Clinical Assistant Physician, Gouverneur Hospital

Vera H. Jones, M.D., 930 Monroe St., Denver, Colo., Director, Division of Maternity and Child Health

John O. McCall, D.D.S., 422 E. 72 St., New York, N. Y., Director, Murry and Leonie Guggenheim Dental Clinic

Joseph C. Palmer, M.D., 130 W. Genesee St., Syracuse, N. Y., Health Director, Public Schools

Harry Strusser, D.D.S., 6807 Clyde St., Forest Hills, L. I., N. Y., Chief, Division of Dental Service, New York City Dept. of Health

Lucy P. Sutton, M.D., 168 E. 74 St., New York, N. Y., School Physician

Public Health Education Section

Raymond G. Hollis, M.D., Taos, N. Mex., Medical Dept., U. S. Indian Service

Public Health Nursing Section

Henrietta W. Bonheyo, 1084 Blueridge Ave. N.E., Atlanta, Ga., Territorial Supervisor, Metropolitan Life Insurance Co., Nursing Service

Eleanor C. Busier, Maple St., South Dayton, N. Y., Staff Nurse, Cattaraugus County Dept. of Health

Clara M. Chitwood, 7 Elizabeth, Ellicottville, N. Y., Staff Nurse, Cattaraugus County Dept. of Health

Myrtis M. Coltharp, R.N., American Red Cross, Civic Auditorium, San Francisco, Calif., Nursing Field Representative

Mary C. Connor, 2308 Ashmead Place N.W., Washington, D. C., Director, Public Health Nursing Course, School of Nursing, Catholic University

Jessie W. Faris, 3015 E. Broad St., Richmond, Va., formerly Staff Nurse, City Board of Health

Lillian Greene, Box 213, Walnut Ridge, Ark., Public Health Nurse, Lawrence County

Elizabeth M. Hill, R.N., American Red Cross, Washington, D. C., Nursing Field Representative

Zeda D. Loveless, Davidson County Health Dept., Nashville, Tenn., Staff Nurse

Elsie E. McMahon, R.N., 349–6th, Huron, S. D., School Nurse

Aline S. Mergy, 438 N. 9th St., Terre Haute, Ind., Director, Public Health Nursing Assn.

Mary V. Pagaud, 4400 Dauphine St., Army Base #3, New Orleans, La., Superintendent of Nurses, Child Welfare and Community Health Assn.

Mary L. Railey, 3435 Upperline St., New Orleans, La., Executive Secretary, Child Welfare and Community Health Assn.

Abbie R. Weaver, Capitol, Atlanta, Ga., Nurse, State Dept. of Public Health

Epidemiology Section

Antonio D. Albertini, M.D., Ave. de Bruselas #20, Reparto Kohly, Marianao, Habana, Cuba, President, Finlay Institute.

Clifford R. Eskey, M.D., Rm. 204, Federal Office Bldg., San Francisco, Calif., Investi-

gating Sylvatic Plague in western states, *U. S. Public Health Service*

Charles F. McKhann, M.D., 300 Longwood Ave., Boston, Mass., Assistant Professor of Pediatrics and Communicable Diseases, Harvard School of Public Health

Pedro Nogueira, M.D., c/o Dr. Carr, Apartado 157, Havana, Cuba, Field Director, Comision de Malaria de Cuba

Unaffiliated

N. Talley Ballou, D.D.S., State Dept. of Health, Richmond, Va., Director of Mouth Hygiene

Walter T. Davis, M.D., Joe Wheeler Dam, Ala., with Tennessee Valley Authority

Mihkel Kask, M.D., Institute of Hygiene, University of Tartu, Tartu, Estonia, First Assistant

Paul A. Lembcke, M.D., 79 Madison Ave., New York, N. Y., Assistant Director of Medical Care, F.E.R.A.

Kenneth M. Wilson, 386-4th Ave., New York, N. Y., *Finacial Secretary*, New York Tuberculosis and Health Assn.

DECEASED MEMBERS

Carroll Fox, M.D., Rosebank, S. I., N. Y., Elected Member 1915, Fellow 1922

J. E. Rush, M.D., Pittsburgh, Pa., Elected Member 1914, Fellow 1922

P. A. Bendixen, M.D., Davenport, Ia., Elected Member 1934

Edward L. Kingman, M.D., Newton, Conn., Elected Member 1935

Annie D. MacRae, M.D., San Francisco, Calif., Elected Member 1920

Cesar Molinas Opisso, Barcelona, Spain, Elected Member 1933

Mabel L. Smyth, Honolulu, T. H., Elected Member 1928

APPLICANTS FOR FELLOWSHIP

In accordance with the By-laws of the Association, the names of applicants for Fellowship are officially published herewith. They have requested affiliation with the Sections indicated. Action by the various Section Councils, the Committee on Fellowship and Membership, and the Governing Council will take place between now and the time of the New Orleans Annual Meeting.

HEALTH OFFICERS SECTION

Henry D. Chadwick, M.D., Boston, Mass.

Raymond D. Fear, M.D.. Dr.P.H., Stamford, Conn.

Andrew J. Krog, Plainfield, N. J.

James R. McEachern, M.D., Tampa, Fla.

K. E. Miller, M.D., Evanston, Ill.

William H. F. Warthen, M.D., Baltimore, Md.

LABORATORY SECTION

Chester S. Bowers, B.S., Hartford, Conn.

Thomas D. Kendrick, M.D., D.P.H., Rochester, Minn.

VITAL STATISTICS SECTION

Robert J. Vane, New York, N. Y.

PUBLIC HEALTH ENGINEERING SECTION

Thomas R. Camp, B.S., S.M., Cambridge, Mass.

Malcolm Pirnie, S.B., M.C.E., New York, N.Y.

FOOD AND NUTRITION SECTION

Milton E. Parker, S.B., Danville, Ill.

CHILD HYGIENE SECTION

Arville O. DeWeese, M.D., Kent, O.

Martha M Eliot, M.D, Washington, D C.

PUBLIC HEALTH EDUCATION SECTION

Thomas G. Hull, M.S., Ph.D., Chicago, Ill.

Lucy S. Morgan, M.S., M.A., New Haven, Conn.

PUBLIC HEALTH NURSING SECTION

Geneva F. Hoilien, Ithaca, N. Y.

Lillian A. Hudson, B.S., A.M., New York, N. Y.

Donna M. Pearce, B.S., R.N., Nashville, Tenn.

EPIDEMIOLOGY SECTION

Arthur H. Cummings, M.D., C.P.H., Albany, N. Y.

Frederick S. Leeder, M.D., D.P.H., Coldwater, Mich.

James E. Perkins, M.D., Dr.P.H., Amsterdam, N. Y.

Milton V. Veldee, M.S., M.D., Washington, D. C.

UNAFFILIATED

George Baehr, M.D., New York, N. Y.

George B. Darling, Dr.P.H., Battle Creek, Mich.

Charles G. Giddings, Jr., M.D., Atlanta, Ga.

Frank Kiernan, A.B., New York, N. Y.

Eleanor J. Macdonald, A.B., Boston, Mass.

Robert E. Wodehouse, M.D., D.P.H., Ottawa, Ont., Canada

NEWS FROM THE FIELD

UNIVERSITY OF CALIFORNIA AT LOS ANGELES—SUMMER SESSION

SUMMER school courses in Public Health and Nursing Education are being given at the University of California at Los Angeles as follows:

June 27–August 7, 1936

- Elementary Epidemiology
- Vital Statistics
- Principles and Practice of Public Health Nursing
- Principles of Supervision in Public Health Nursing
- Administration of Schools of Nursing
- Principles of Nursing Education
- Administration of the School Health Program
- Essentials of Nutrition
- The Relation of Diet to the Treatment of Disease
- Social Case Work
- Principles of Teaching as Applied to Home Hygiene Courses
- Methods in Teaching Home Hygiene Courses
- Maternal and Child Welfare

For information, write to the Dean of the Summer Session of the University, 405 Hilgard Avenue, Los Angeles, Calif.

WAGNER COLLEGE

A COURSE in bacteriology will be offered in the Summer Session of Wagner College, Staten Island, N. Y., from July 6 to August 15.

It is stated that this course is to be of particular interest to college students majoring in the biological sciences and to public health workers, and is a prerequisite for courses in serology, clinical pathology, and blood chemistry, offered in the fall and spring sessions as part of the curriculum for laboratory technicians.

HARVARD PUBLIC HEALTH DEGREES FOR WOMEN

WOMEN will be permitted to take degrees at the School of Public Health of Harvard University.

In the past, women have been eligible for the Certificate of Public Health upon completion of a course of study at the School of Public Health. Now they may become candidates for the degree of Doctor of Public Health or Master of Public Health, on the same basis as men students. In order to become candidates for either degree applicants must satisfy the Administrative Board of their academic fitness by a medical degree or its equivalent, from an approved medical school.

FELLOWSHIPS IN PUBLIC HEALTH

MORLEY B. BECKETT, M.D., of Lansing, Mich., member A.P.H.A., has been appointed to the staff of the W. K. Kellogg Foundation to work out the details for a fellowship system to enable graduate students in public health administration and kindred fields to obtain practical experience, it is reported.

Two full-time fellowships are now being planned, for which applicants must be graduates of recognized schools with special training in the public health field. Dr. Beckett plans to devote six months to the development of these fellowships.

Dr. Beckett, formerly Director of County Health Administration of the Michigan State Health Department, has served with the Health Department of Cleveland, as Assistant Health Commissioner of Saginaw, and Health Officer of Isabella County, Mich.

NORTHWESTERN UNIVERSITY SAFETY RESEARCH

AN Institute of Public Safety has been established at Northwestern University, to be financed by the Automobile Manufacturers' Association and

the university. It will be a research laboratory for traffic safety problems and headquarters for the traffic control program of the International Association of Chiefs of Police.

The Institute will coöperate with the National Safety Council in its campaign for traffic death reduction, install traffic accident prevention bureaus in selected cities and states, provide traffic information service to police departments, and assist in improving traffic curricula by coöperating with Harvard University's accident prevention bureau and other agencies.

Franklin M. Kreml, police lieutenant in Evanston, Ill., which has won the National Safety Council's "safest city" award three times in the last 4 years, was appointed Director of the Institute.—*J.A.M.A.*, May 2, 1936.

CONGRESS OF JEWISH PHYSICIANS

THE first World Congress of Jewish Physicians was held in Jerusalem at the Hebrew University in Tel Aviv on April 21–24.

The program included reports on the situation of Jewish physicians; reports on medical education, hygienic conditions of the Jewish population in Palestine and other countries with large Jewish population, Jewish institutions for preventive medicine and sanitary service, foundation of a world union of Jewish physicians, and scientific lectures on anthropology and eugenics.

MASSACHUSETTS NEW HEALTH UNIT

A NEW health unit has been organized in Franklin County to serve the towns of Monroe, Rowe, Heath, Charlemont, Irving, and Shutesbury, Mass.

The unit, which began to function April 1, will be maintained by federal and state funds until other towns join, it was reported. Walter W. Lee, M.D., member A.P.H.A., of North Adams, Mass., is in charge.

DR. LONG ELECTED PRESIDENT OF NATIONAL TUBERCULOSIS ASSOCIATION

AT the meeting of the National Tuberculosis Association, at New Orleans in April, Esmond R. Long, M.D., member A.P.H.A., Director of the Henry Phipps Institute of the University of Pennsylvania, was elected President of the National Tuberculosis Association, to succeed James J. Waring, M.D., member A.P.H.A., of Denver, Colo.

Hugh S. Cumming, M.D., Fellow A.P.H.A., former Surgeon General of the U. S. Public Health Service, was elected an honorary member. The Trudeau Medal of the Association was awarded to Dr. Edward W. Archibald, Professor of Surgery at McGill University, Montreal, and Consulting Surgeon at the Royal Victoria Hospital for his work on thoracic surgery.

METROPOLITAN HEALTH OFFICERS CONFERENCE

HEALTH officers of three states, New York, Connecticut, and New Jersey, met June 5 at the New York City Health Department offices and organized the Metropolitan Health Officers Conference. Its aim is to bring to the metropolitan area greater uniformity in administrative procedure in public health, closer coöperation in health problems, and closer personal relationships.

Matthias Nicoll, Jr., M.D., Fellow A.P.H.A., Commissioner of Health of Westchester County, N. Y., was elected temporary chairman of the conference, and Charles F. Bolduan, M.D., Fellow A.P.H.A., Director of the Bureau of Health Education of the New York City Health Department, was named temporary executive secretary.

This session was devoted to three main topics: Rabies and the Dog Control Problem; Food Poisoning—pastry products mainly; and Milk Grading.

NEW YORK ILLEGITIMACY BILL SIGNED

GOVERNOR LEHMAN signed a bill, on June 4, designed to help remove the stigma of illegitimacy from children born out of wedlock by providing that State birth certificates need not disclose the marital name or status of the mother.

Provision is made in the bill, which was drafted by a special commission appointed by Governor Lehman, that there shall be no specific statement on the birth certificate as to whether the child was born in wedlock or not.

HOMER FOLKS TUBERCULOSIS HOSPITAL

THE New York State Legislature recently passed a bill providing that the new State Tuberculosis Sanatorium located at Oneonta, N. Y., should be named the Homer Folks Tuberculosis Hospital, in honor of Homer Folks, F.A.P.H.A., for many years Secretary of the State Charities Aid Association, New York, and member of the New York Public Health Council. The new hospital is to be dedicated in July by Governor Lehman.

The first of the new tuberculosis hospitals recently opened by New York State has been named after the late Dr. Hermann M. Biggs, former State Commissioner of Health.

STUDENT HEALTH SURVEY

STUDENTS entering the University of California and Leland Stanford University, Calif., in the fall of 1935, are to be the subject of a 10 year study, according to the *Bulletin* of the National Tuberculosis Association. The physical histories of these students, numbering about 5,000, will be kept in the two universities, and follow-up records will be kept following graduation.

A permanent research committee has been established with representatives of all supporting tuberculosis associations participating, together with representatives of the student health services in the universities and a research adviser.

The expense of the research is to be borne by the regional tuberculosis associations and by the institutions coöperating.

SOUTH CAROLINA HEALTH OFFICERS

NEW Health Officers for districts and counties in South Carolina have been announced as follows:

Dr. Gordon R. Westrope, of Columbia, S. C.—Cherokee County

Dr. John Y. O'Daniel, of Erwin, Tenn.—Marlboro County

Dr. George Fletcher Reeves, of Goldsboro, N. C.—Colleton County

Dr. Edward P. White, of Gaffney, S. C.—Richland County

Dr. William Burns Jones, of Columbia, S. C.—Chester and Union Counties

Dr. Thomas B. Phinizy, of Augusta, Ga.—Bamberg, Allendale, and Barnwell Counties

OHIO HEALTH DEPARTMENTS MERGE

THE Hocking and Vinton County Health Departments have merged, forming a new district health department, under the supervision of Dr. Walter B. Lacock, Health Commissioner of Hocking County.

Dr. Herbert D. Chamberlain, of McArthur, Ohio, Health Officer of Vinton County, will retire.

PERSONALS

FRIEND LEE MICKLE, F.A.P.H.A., of Hartford, Conn. (Secretary of the Laboratory Section, A.P.H.A.), received the honorary degree of Sc.D. at the 25th Commencement of Allegheny College, Meadville, Pa., on June 8.

CHARLES F. WILINSKY, M.D., Fellow A.P.H.A., of Boston, Mass., has been appointed Chairman of the Committee on Public Health Relations of the American Hospital Association. His predecessors were Surgeon General Hugh S. Cumming, M.D., and Milton J. Rosenau, M.D.

G. HOWARD GOWEN, M.D., member A.P.H.A., on July 1 assumes the duties of Assistant Epidemiologist, in the Illinois Department of Public Health, Springfield. He will continue his affiliation with the University of Illinois College of Medicine in Chicago.

ANNA W. WILLIAMS, M.D., F.A.P.H.A., formerly Assistant Director of the Research Laboratory of the New York City Department of Health, received on April 27, in recognition of her 40 years of service to New York City, a testimonial scroll presented by the Women's Medical Society of New York State. The presentation was made by S. Josephine Baker, M.D., F.A.P.H.A., President of the Society.

EDWIN O. JORDAN, PH.D., F.A.P.H.A., Professor of Bacteriology and Chairman of the Department at the University of Chicago, has been elected a member of the National Academy of Science.

RICHARD ARTHUR BOLT, M.D., DR.P.H., F.A.P.H.A., Director of the Cleveland Child Health Association, and Associate in Pediatrics and in Public Health and Hygiene at Western Reserve University, Cleveland, Ohio, is conducting courses in Elementary Epidemiology, Vital Statistics, and Administration of the School Health Program, in the Summer School of Public Health and Nursing Education, of the University of California at Los Angeles, this summer.

DR. MARSHALL C. BALFOUR, representative in Greece of the International Health Board of the Rockefeller Foundation, according to the *Journal of the American Medical Association,* has been awarded the Silver Medal for Distinguished Services by the Greek Academy of Sciences, Arts and Letters, in recognition of research in the field of malaria control.

R. G. BEACHLEY, M.D., F.A.P.H.A., who for years has been Deputy State and County Health Officer at Chestertown, Md., has accepted a position as Deputy Director of Rural Health for Virginia at Abingdon, with 14 counties in his district.

DR. FRANK W. PARKER, JR., has been appointed Health Officer of the Tenth Health District of New Mexico, with headquarters at Silver City, N. M.

DR. EDWARD ROBINSON BALDWIN, Director of the Edward L. Trudeau Foundation, Saranac Lake, N. Y., was presented with the Kober Medal at the annual meeting of the Association of American Physicians in Atlantic City, N. J., May 6. The medal is awarded each year.

ALVIN R. LAMB, PH.D., formerly of the U. S. Public Health Service and the Leprosy Investigation Station, Honolulu, has become research associate at the Experiment Station of the Hawaiian Sugar Planters' Association, Honolulu.

KARL F. MEYER, PH.D., F.A.P.H.A., Director of the Hooper Foundation for Medical Research, University of California Medical School, San Francisco, Calif., received the honorary degree of Doctor of Medicine. This was conferred on him by the College of Medical Evangelists, of Los Angeles, on April 23.

DR. WILLIAM E. STEELE, of Olympia, Wash., has been appointed Medical Director in the Washington State Department of Labor and Industries, to succeed Dr. Harry Eugene Allen, of Seattle, resigned. Dr. Harry L. Leavitt, of Seattle, has been appointed Assistant Director to succeed Dr. Steele.

JAMES THOMAS CULBERTSON, PH.D., instructor in bacteriology, Columbia University, New York, has received a fellowship from the John Simon Guggenheim Memorial Foundation for study of immunity against para-

sitic diseases at the London School of Hygiene and Tropical Medicine. Michael Heidelberger, Ph.D., associate professor of biologic chemistry at Columbia, received a renewal of a grant for study of immune reactions.

DR. AUGUSTUS L. L. BAKER, of Dover, N. J., has been appointed a member of the New Jersey State Board of Health, to succeed Dr. Samuel A. Cosgrove, of Jersey City, whose term expired.

HENRY C. GAHAGAN, M.D., of Shreveport, La., has been appointed Director of the Coushatta Health Unit, succeeding Bernard Hochfelder, M.D., member A.P.H.A., resigned.

LEONARD A. DEWEY, M.D., member A.P.H.A., of Portales, N. M., who has been Acting Health Officer of the Tenth Health District of New Mexico, with offices at Silver City, N. M., has been appointed Epidemiologist in the New Mexico State Health Department.

EDYTHE P. HERSHEY, M.D., member A.P.H.A., Director of Health in the Dallas public schools, has been appointed Director of the Child Health and Maternity Divisions of the Texas State Health Department.

DR. ROBERT J. JAEHNE, of Austin, was recently named Health Officer of Travis County, Tex.

DR. MACK I. SHANHOLTZ, of Beckley, W. Va., has been appointed Director of the health district comprising Bristol and Washington Counties, with headquarters at Bristol, Va.

CHARLES L. SAVAGE, M.D., member A.P.H.A., of Charlottesville, has been appointed Director of the Buchanan-Russell-Tazewell Health District, with headquarters at Richlands, Va.

DR. ROBERT J. LANNING, of Junction City, has been named County Physician and Health Officer of Geary County, Kans., succeeding the late William S. Yates, M.D., member A.P.H.A.

GUY R. POST, M.D., member A.P.H.A., Director of the tricounty health unit of Newaygo, Oceana, and Lake Counties, with offices at White Cloud, Mich., has been named to a similar position with a newly organized unit in Mecosta and Osceola Counties, with headquarters in Big Rapids.

DR. NINA C. WILKERSON has been appointed Health Officer of Sturgis, Mich., succeeding Dr. Charles G. Miller.

DR. NEAL J. MCCANN has been named Health Officer of Ishpeming, succeeding Dr. Joseph P. Bertucci.

THEODORE MEYER, M.D., DR.P.H., member A.P.H.A., Health Officer of Van Buren County, Mich., has been appointed Health Officer of St. Louis County, with headquarters at Clayton, Mo.

DR. WILLIAM M. TAPPAN has been appointed Health Officer of Holland, Mich., succeeding Dr. William Westrate.

FREDERICK FULLER RUSSELL, M.D., F.A.P.H.A., lecturer in Preventive Medicine and Hygiene and Epidemiology, Harvard Medical School, Boston, and formerly Director of the International Health Division of the Rockefeller Foundation, has been awarded the Public Welfare Medal of the National Academy of Sciences.

THURMAN B. RICE, M.D., F.A.P.H.A., Assistant Director of the Indiana State Health Department, has been named Director of Physical and Health Education in charge of the new program of child health that has been announced for the public schools of Indiana as part of the state's activities in connection with the federal government's social security plan.

LESLIE A. LAMBERT, M.D., member A.P.H.A., City Health Officer of Flint, Mich., became Head of the State Bureau of the local health service in Idaho, a job corresponding to state health officer.

DR. SHALER A. RICHARDSON, of Jacksonville, Fla., has been appointed a member of the Florida State Board of Health, succeeding the late Harry Dash Johnson, of Daytona Beach.

HARRY R. DESILVA, PH.D., of Amherst, Mass., has resigned as professor of psychology in charge of the psychologic laboratory, Massachusetts State College, to join the staff of the Bureau for Street Traffic Research of Harvard University.

DR. EDWIN M. MAHONEY was elected Secretary of the newly appointed Health Board of Holyoke, Mass. Other members are Arthur Hebert, Chairman, and Dr. Joseph W. Wonsik.

DR. HENRY C. LINDERSMITH, of Sherwood, Ohio, has been appointed Health Officer of Defiance County.

DR. CHARLES J. HATFIELD, Director of the Henry Phipps Institute, University of Pennsylvania, Philadelphia, Pa., has been appointed official representative of the National Tuberculosis Association for the conference of the International Union Against Tuberculosis to be held in Lisbon, Portugal, September 7–10.

CHARLES P. DRURY, M.D., member A.P.H.A., for 8 years secretary of the county medical society, was appointed Health Officer of Marquette, Mich., effective April 1, succeeding the late Frederick McD. Harkin, M.D., member A.P.H.A.

DR. WELLS F. SMITH, of Little Rock, has been elected President of the Arkansas State Board of Health.

DR. CHARLES D. LIPSCOMB, of Quitman, Tex., was recently appointed Health Officer of Wood County.

DR. HOWARD E. M. BOOCKS, of Logan, Ohio, has been appointed Health Officer of Logan County.

DR. JOHN B. H. BONNER, of Beaumont, Va., was appointed Director of the Sussex County Health District, with headquarters in Stony Creek.

DR. JOHN S. COOPER, of Greenville, Tex., has been appointed City Health Officer, to succeed Dr. Benjamin F. Arnold.

ELMER G. BALSAM, M.D., member A.P.H.A., of Billings, Mont., has been reappointed a member of the Montana State Board of Health.

DR. LAWRENCE ISENHART has been named to succeed Dr. Samuel P. Colehour, resigned, as Health Officer of Mount Carroll, Ill.

DR. WALTER E. MERCER, for 4 years Health Officer of Webberville, Mich., has been placed in charge of the Bureau of Child Health of the Lansing Department of Health.

DEATH

CARROLL FOX, M.D., F.A.P.H.A., Head of the U. S. Quarantine Station at Rosemont, S. I., N. Y., died on May 14. He has been a member of the A.P.H.A. since 1915 and was a Charter Fellow. He served in the U. S. Navy during the War, and later entered the U. S. Public Health Service. C. V. Atkin, M.D., will take over the direction of the Quarantine Station pending an official appointment in Washington.

WILLIAM S. YATES, M.D., member A.P.H.A., Health Officer of Geary County, with offices at Junction City, Kans., died recently.

FREDERICK MCD. HARKIN, M.D., member A.P.H.A., of Marquette, Mich., died in March, 1936.

JAMES H. PAUL, M.D., of Jamesville, N. Y., died recently. Dr. Paul had been Health Officer of Dewitt since 1912.

CONFERENCES AND DATES

June 6–Nov. 29, Medical Exhibit "Story of Life," in Texas Centennial Exposition, Dallas, Tex.

June 15–Aug. 21, Speech Conference, University of Denver, Denver, Colo.

July, Third International Conference on Social Work Problems, London.

July 9–20, Exhibit of Educational Publications, New York University (Summer Session), 29 Washington Place, New York, N. Y.

July 6–10, 29th Annual Meeting of the American Home Economics Association, Olympic Hotel, Seattle, Wash.

July 6–11, The Royal Sanitary Institute, Southport, England.

July 13–17, American Dental Association, San Francisco, Calif.

July 15–17, League of South Dakota Municipalities, Rapid City, S. Dak.

July 18–23, Third International Open Air School Congress, Bielefeld and Hanover, Germany.

July 19–23, International Convention for the Health of University Students, Athens, Greece.

July 20–24, Oklahoma Water and Sewage Conference, Stillwater, Okla.

July 25–Aug. 1, The Second International Congress of Microbiology, London.

July 27–29, Annual Meeting, Union of Canadian Municipalities, Vancouver, B. C.

Aug. 2–8, Annual Meeting, National Institute for Commercial and Trade Organization Executives, Northwestern University, Evanston, Ill.

Aug. 11–14, American Veterinary Medical Association, Deshler-Wallick Hotel, Columbus, O.

Aug. 16–22, National Hospital Association, Philadelphia, Pa.

Aug. 16–22, National Medical Association, Philadelphia, Pa.

Aug. 18–20, League of Iowa Municipalities, Davenport, Iowa.

Aug. 19–21, Annual Meeting—Central States Section, American Water Works Association, Hotel Cleveland, Cleveland, Ohio

Aug. 29–Sept. 6, Third Postgraduate Course of the International Hospital Association, Prague, Czechoslovakia.

Aug. 31–Sept. 12, Harvard Tercentenary Conference of Arts and Sciences, Cambridge, Mass.

Sept. 2–4, Annual Convention, Union of Nova Scotia Municipalities, Digby, Nova Scotia.

Sept. 2–4, Annual Meeting, Ontario Municipal Association, Toronto, Ont.

Sept. 7–10, International Union Against Tuberculosis, Lisbon, Portugal.

Sept. 7–12, Third World Power Conference, National Power Policy Committee, Department of the Interior Building, Washington, D. C.

Sept. 14–17, Annual Convention, League of California Municipalities, Santa Monica, Calif.

Sept. 14–17, Annual Meeting, California Sewage Works Association, Santa Monica, Calif.

Sept. 15–30, First International Congress of Sanatoria and Private Nursing Homes; Margitsziget, Sanatorium, Budapest, Hungary.

Sept. 21–23, Annual Convention, American Institute of Park Executives and the American Park Society, South Bend, Ind.

Sept. 21–23, Annual Meeting, Rocky Mountain Section—American Water Works Association, Denver, Colo.

Sept. 22–25, Annual Meeting—New England Water Works Association, Pennsylvania Hotel, New York, N. Y.

Sept. 23–25, Annual Meeting of the New York State Association of Dairy and Milk Inspectors, Van Curler Hotel, Schenectady, N. Y.

Sept. 23–26, Mississippi Valley Conference on Tuberculosis, The Mississippi Valley Sanatorium Association,

Hotel Pere Marquette, Peoria, Ill.

Sept. 24–25, Annual Meeting, League of Wisconsin Municipalities, Manitowoc, Wis.

Sept. 28–30, Public Works Congress—American Society of Municipal Engineers—International Association of Public Works Officials, Toronto, Ont.

Sept. 28–Oct. 2, American Hospital Association, Cleveland, O.

Oct. 5–9, Annual Safety Congress and Exposition, National Safety Council, Atlantic City, N. J.

Oct. 10–18, National Dairy Show, Dallas, Tex.

Oct. 12–15, Annual Convention—Southwest Section, American Water Works Association, Fort Smith, Ark.

Oct. 12–17, The Dairy Industries Exposition, Atlantic City, N. J.

Oct. 12–18, Third International Congress on Malaria, Madrid, Spain.

Oct. 14–16, Annual Convention, Pennsylvania Water Works Association, Haddon Hall, Atlantic City, N. J.

Oct. 14–17, Annual Civil Service Assembly of the United States and Canada, Cincinnati, Ohio.

Oct. 17–25, Centennial Exposition Dairy Show, Atlantic City, N. J.

Oct. 19–21, Annual Meeting, International City Managers' Association, Richmond, Va.

Oct. 20–23 (Tues., Wed., Thurs., Fri.), Sixty-fifth Annual Meeting of the American Public Health Association, New Orleans, La. Meetings Headquarters, Municipal Auditorium; Residence Headquarters, Hotel Roosevelt.

Oct. 20–23, American Association of School Physicians, Hotel Roosevelt, New Orleans, La.

Oct. 21–23, Ontario Hospital Association, Toronto, Ont.

Oct. 26–28, Annual Meeting—Missouri Valley Section, American Water Works Association, Kansas City, Mo.

Oct. 26–28, National Association of Exterminators & Fumigators, Cleveland, Ohio.

Oct. 26–28, Annual Meeting, North Carolina Section—American Water Works Association, Hotel Charlotte, Charlotte, N. C.

Oct. 29–31, Annual Meeting of the Association of Military Surgeons, Detroit, Mich.

Nov. 8–11, Annual Meeting, National Association of Commercial Organization Secretaries, Omaha, Nebr.

Nov. 9–12, Association of Dairy, Food and Drug Officials of the United States, Miami Biltmore Hotel, Coral Gables, Fla.

Nov. 9–15, American Education Week. Write: Educational Press Assn., N. J. *Educational Review,* 605 Broad Street, Newark, N. J.

Nov. 11–13, Refrigeration Service Engineers Society, Hotel Gayoso, Memphis, Tenn.

Nov. 17–20, Southern Medical Association, Baltimore, Md.

Dec. 28–30, Society of American Bacteriologists, Indianapolis, Ind.

Positions Wanted

LABORATORY

Young woman, graduate University of Maryland, desires position as bacteriologist. Available now. L-251

Young man, six years' experience as director of laboratory of city health department, 4 years owner and manager of a private laboratory, desires position as bacteriologist, chemist or sanitary inspector. L-252

Young woman, A.B. Bates College; several years' experience in various state laboratories, desires position as bacteriologist. L-253

Woman, graduate North West Institute of Medical Technology; 2 years' experience as technician in private laboratory; is available now for position as laboratory technician and general office worker. L-256

Woman physician, M.D. Johns Hopkins Medical School, Dr.P.H. Johns Hopkins School of Hygiene and Public Health; 10 years' experience as pathologist and director of laboratory in a sanatorium; is interested in a position involving the bacteriology of the tubercle bacilli. L-257

Man, with M.S. major in Bacteriology and Biochemistry, desires position with University, Health Department or Biological House. Five years' experience as research assistant in bacteriology and serology in a Class A Medical School. L-210

MISCELLANEOUS

Woman physician, M.D. Boston University, Graduate work in health education in Columbia University and Massachusetts Institute of Technology; ten years' experience in college health work and teaching; some experience in child hygiene, psychiatry and with delinquent women; desires a position in school, college, child welfare or institutional work. M-248

Woman physician, M.D. Indiana University School of Medicine; 13 years' experience as the director of child hygiene in a state department of health, experience in adult education both as a teacher and administrator; desires position in health education or child hygiene. M-249

Young physician, M.D. University of Berlin, licensed in New York State, is available now for a position with an industrial concern. M-254

Young woman, Ph.D. Columbia University; considerable experience in the field of health education with official, voluntary and commercial organizations, is interested in a position as Director of Public Health Education in a City, State, or Agency. Available in September. M-255

Young man, age 30, eight years' experience as milk and food inspector in large eastern city. Capable of assuming responsible position in administrative or inspectorial capacity in small or medium-sized city. Preferably in East or South. M-258

ENGINEER

Young man, graduate in engineering; several years' experience as director of a division of sanitation in a county health department; desires a position in public health engineering, administrative work preferred. E-250

HEALTH OFFICERS

Physician, M.D. Ohio State University; several years' experience in various positions with a state health department, desires position as supervisor, rural or city health administration. A-237

Physician, M.S.P.H. Columbia University, with experience in district health administration desires position as health officer or in other public health administrative capacity. A-227

Persons with medical and post-graduate education who are seeking employment are invited to communicate with the Executive Secretary in regard to several available opportunities.

Where no other address is given excepting the key number, address your replies to the American Journal of Public Health, 50 West 50th Street, New York City, indicating clearly the key number on the envelope. Your replies will then be forwarded.

VITAMINS IN CANNED FOODS

I. VITAMIN C

• The history of scurvy is as old as the history of exploration and conquest. Its ravages among early explorers and invaders are recorded in the oldest pages of history, due principally to the fact that during extended sea voyages or treks by land, dependence had necessarily been placed almost entirely on foods preserved by the crude methods of the day.

Scurvy was the first vitamin deficiency disease to be controlled by dietary management. In 1757, Lind recognized the fact that some substance in foods exerted a specific protective action against scurvy (1). As early as 1804, the daily lime juice ration became compulsory in the British Navy (2).

However, it remained for modern biochemical science to establish the chemical identity of this antiscorbutic factor. Vitamin C is now known to be identical with cevitamic acid (levo-ascorbic acid) and is as yet the only vitamin to be synthesized in the laboratory (3).

There would appear to be no valid reason why scurvy should ever constitute a serious threat to the health of the average American infant or adult. Development of refrigerated transportation for raw foods and improvements in modern methods of food preservation, specifically canning methods, make available to the consumer during the entire year a large variety of foods possessed of valuable vitamin C contents. In addition, the modern trend towards education of the layman, in regard to the vitamin C requirements of both the infant and the adult, should also assist in complete eradication of infantile and adult scurvy from America.

Many canned foods are to be valued as contributors of vitamin C. Nutritional research has indicated that canned products such as the citrus fruits or citrus fruit juices (4), the more common fruits (5), and vegetables or vegetable juices, are important sources of the antiscorbutic factor (6). Modern canning procedures afford a good degree of protection to this labile vitamin, with the result that the canned food can be relied upon to supply amounts of vitamin C to the diet consistent with the amounts of the vitamin originally contained in the raw food from which it was prepared.

AMERICAN CAN COMPANY

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(1) Vitamins: A Survey of Present Knowledge. Page 187 Medical Research Council, Special Report 167. 1932. His Majesty's Stationery Office, London.
(2) Vitamins in Theory and Practice. Page 86. L. J. Harris, 1935. Macmillan, New York.
(3) 1933 J. Chem. Soc. *136*, 1419
(4) 1930 J. Home Econ. *22*, 553
(5) 1935 Amer. Jour. Pub. Health, *25*, 1340
(6) 1928 Ind. Eng. Chem. *25*, 632

This is the fourteenth in a series of monthly articles, which will summarize, for your convenience, the conclusions about canned foods which authorities in nutritional research have reached. We want to make this series valuable to you, and so we ask your help. Will you tell us on a post card addressed to the American Can Company, New York, N. Y., what phases of canned foods knowledge are of greatest interest to you? Your suggestions will determine the subject matter of future articles.

ACCEPTED AMERICAN MEDICAL ASSN. Committee on Foods

The Seal of Acceptance denotes that the statements in this advertisement are acceptable to the Committee on Foods of the American Medical Association.

American Journal of

Public Health

And *The Nation's Health*

Volume 26 — August, 1936 — Number 8

Sixty-fifth Annual Meeting, New Orleans, La., October 20-23, 1936

Meeting Headquarters, Municipal Auditorium

Residence Headquarters, Hotel Roosevelt

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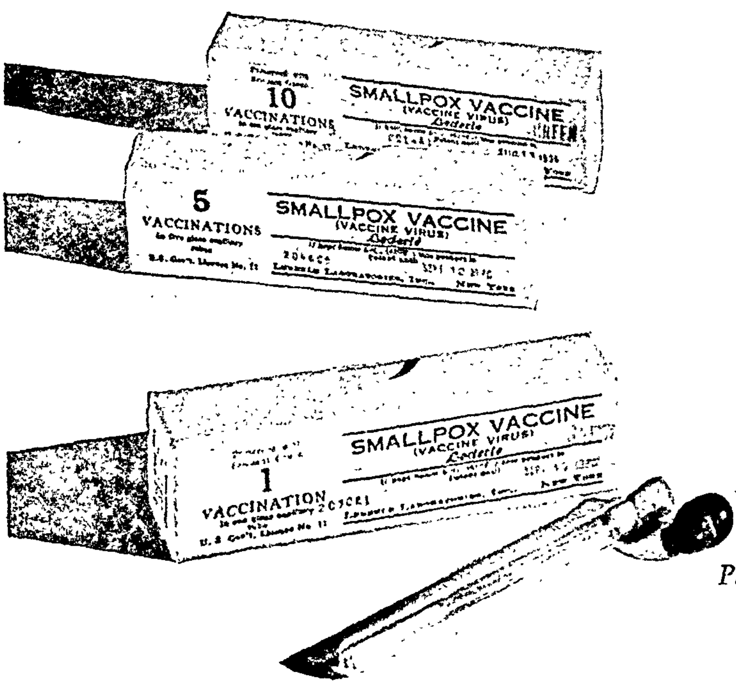

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Volume 26 August, 1936 Number 8

CONTENTS

Continued on page vi

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Readers' Guide in your library.

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Entered as second-class matter at the Post Office at Albany, N. Y., September 17, 1932.

Continued on page viii

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Contents—Continued

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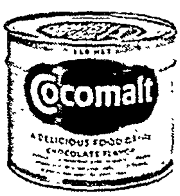

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MEETINGS OF AFFILIATED SOCIETIES

and A. P. H. A. Branches

Society	*Secretary*	*Place and Time of Annual Meeting*
Connecticut Public Health Assn.	Ira V. Hiscock	May, 1937
Florida Public Health Association	S. G. Thompson, D.P.H.	Tampa, December, 1936
Georgia Public Health Association	M. E. Winchester, M.D.	To be announced
Massachusetts Public Health Assn.	G. Donald Buckner, S.B.	Boston, January 28, 1937
Michigan Public Health Association	Marjorie Delavan	Lansing, Nov. 11–13, 1936
Missouri Public Health Association	Dr. C. F. Adams	Columbia, Oct. 1–3, 1936
New Mexico Public Health Assn.	Paul S. Fox	To be announced
Northern California Public Health Association	Dr. I. O. Church	To be announced
Ohio Federation of Public Health Officials	W. D. Bishop, M.D.	Columbus, November, 1936
Pennsylvania Public Health Assn.	J. M. J. Raunick, M.D.	Harrisburg, Pa., Sept. 17, 1936
South Carolina Public Health Assn.	Laura Blackburn	To be announced
Southern California Public Health Association	Charles W. Arthur	To be announced
Texas Public Health Association	Lewis Bracy	Kilgore, October 13–16, 1936
Virginia Public Health Association	B. B. Bagby, M.D., Pres.	To be announced
West Virginia Public Health Assn.	John Thames, M.D.	October, 1936
Southern Branch, American Public Health Association	G. Foard McGinnes, M.D.	Baltimore, Md., November 17, 18, 1936
Western Branch, American Public Health Association (joint meeting with Canadian Public Health Association)	William P. Shepard, M.D.	Phoenix, Ariz., June, 1937

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Administrative Practice in the West

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STANDARDS of administrative practice have grown up in the East and have been determined very largely by eastern experience. This was no doubt inevitable. The distance from our mountain states to the various headquarters on the eastern seaboard precludes the attendance of western health officers at committee meetings. It may also be true that the typical western states have not pioneered in health administration and have not yet had much experience to offer.

In the result, however, certain factors have not received the attention that, from a western point of view, they deserve. The factor which has been most neglected is that of population per square mile and its corollary factor is wealth per square mile.

An example will make this clear. An advisory committee to the U. S. Public Health Service, representing in its membership Chicago, Baltimore, Boston, Philadelphia, New York, Ann Arbor, and Washington, D. C., recommends[1] that venereal disease control work requires in the state health department a separate section or subdivision under the direction of a full-time officer. They even recommend that each health district should include the same provision. It is hardly conceivable that this committee could have considered or even imagined a state like New Mexico with a population of 394,863 most living at or below the level of bare subsistence and scattered over 122,635 square miles.

Despite its poverty, New Mexico probably spends more per capita on health services than most of its immediate neighbors, and it is one of only 3 states in the Union that have provided full-time public health service for all of their citizens. To do so it has had to lay down some original standards and these are hereby offered not in the belief that they are ideal but simply as a measuring rod for those who in the future may attempt to evaluate practice in the wide open spaces of the West.

Table I shows the population, assessed valuation, estimated income, and approximate area of each of the 10 health districts of the state. The column of income is included to permit comparison with the standard laid down by Smillie[2] that $10,000,000 is the minimum wealth necessary to support a full-time *county* unit. It will be seen that 2 of our districts fall short of this minimum income (estimated by the same method used by Smillie). On the other hand, the

TABLE I

WEALTH AND AREA OF NEW MEXICO HEALTH DISTRICTS

Dist. No.	*Counties Included*	*Population* †	*Assessed Valuation*	*Income* *	*Approximate Area*
I	Rio Arriba, Santa Fe, Taos	52,588	$21,549,280	$15,776,400	10,096
II	McKinley, San Juan	17,612	15,405,429	5,283,600	10,982
III	Bernalillo, Sandoval	52,538	29,833,946	15,761,400	5,085
IV	Doña Ana, Lincoln, Otero, Sierra	48,908	34,407,134	14,672,400	18,407
V	Guadalupe, Mora, San Miguel	40,985	24,858,337	12,295,500	9,779
VI	Chaves, Eddy, Lea	41,535	34,869,400	12,460,500	14,665
VII	Grant, Hidalgo, Luna	30,320	34,322,816	9,096,000	10,404
VIII	Catron, Socorro, Torrance, Valencia	35,124	26,853,345	10,537,200	24,098
IX	Colfax, Harding, Union	34,614	32,179,622	10,384,200	9,789
X	Curry, De Baca, Quay, Roosevelt	40,639	30,724,524	12,191,700	9,198

* Total income of population assuming a per capita income of $300
† 1930 Census

maximum area allowed by the same authority for a health district is 1,000 square miles. The areas of our districts are from 5 to 25 times greater than the maximum acceptable to eastern administrators.

Obviously the district health officer cannot be expected to visit every case

TABLE II

PERSONNEL AND APPROPRIATIONS, NEW MEXICO HEALTH DISTRICTS
ASSUMING SUBSIDY FROM SOCIAL SECURITY ACT

	Director			*Number in Personnel*					
				Full-time				*Part-time*	
Dist. No.	*Name*	*Professional Degree*	*Date Operations Began*	*Medical Officers*	*Inspectors*	*Nurses*	*Clerks*	*Medical Officers*	*Clerks*
1	E. F. McIntyre	M.D.	7- 6-35	1	1	3	3	..	..
2	E. B. Beaver	M.D.	7- 6-35	1	1	2	1	..	1
3	J. R. Scott	M.D.	7- 1-35	1	3	4	2	..	..
4	C. W. Gerber	M.D.	7- 1-35	1	1	5	1	2	3
5	W. W. Johnston	M.D.	8-18-35	1	1	3	3	..	..
6	O. E. Puckett	M.D.	7- 1-35	1	1	3	2	2	1
7	F. W. Parker	M.D.	7- 1-35	1	1	3	1	1	2
8	J. O. Long	M.D.	7-15-35	1	1	6	4	1	..
9	F. C. Diver	M.D.	10-18-35	1	1	3	3	1	..
10	L. A. Dewey	C.P.H., M.D.	7-18-35	1	1	2	2	..	..

	Director		*Annual Appropriations Appropriated by Coöperating Agencies*					
Dist. No.	*Name*	*Total Budget*	*County*	*State*	*U.S.P.H.S.*	*Children's Bureau*	*Commonwealth Fund*	*Other Agencies*
1	E. F. McIntyre	$14,720	$10,820	...	$3,900	....	....	1 clerk
2	E. B. Beaver	14,055	8,845	...	4,500	....	$710	....
3	J. R. Scott	21,870	16,630	...	4,500	....	740	....
4	C. W. Gerber	25,720	18,920	$200	5,700	....	900	....
5	W. W. Johnston	17,485	12,985	...	4,500	....	....	....
6	O. E. Puckett	18,400	12,060	...	5,100	....	....	$1,240
7	F. W. Parker	19,180	11,680	...	5,100	....	2,400	....
8	J. O. Long	25,415	15,275	...	5,100	$5,040	....	1 clerk
9	F. C. Diver	16,595	10,955	65	4,500	....	710	$365
10	L. D. Dewey	14,560	10,060	...	4,500	....	....	....
	Totals	$188,000	$128,230	$265	$47,400	$5,040	$5,460	$1,605

of communicable disease occurring in such vast districts, nor can he expect any special aid from a large number of supporting personnel. Table II shows the number of such personnel assigned to each district and including those subsidized by Title V (Fund A) and Title VI of the Security Act. There are certain situations which must be investigated whatever the inconvenience and whatever the distance to be traveled. We are engaged in finding out for ourselves exactly which situations can be considered as obligatory responsibility within the framework of physical conditions imposed upon us.

Table II also shows the total contribution from tax moneys to local health work. Add to this $51,600 contributed to the state health department and $18,000 contributed in the present fiscal year to the district health officers' fund which will be carried over into the next fiscal year and therefore does not appear in the above table, and we have a per capita expenditure from taxes for health of $.50. This amount can be increased even in a poor state which has adopted a constitutional ceiling of 20 mills taxation on property. But obviously it can only be increased by great pressure and to a limited extent.

The State Health Department has no separate division in charge of (1) food and drugs, (2) dentistry, (3) industrial hygiene, (4) tuberculosis, (5) syphilis, (6) maternity and child hygiene, (7) cancer control, (8) mental hygiene. There are pressure groups, some large, some small, working for the inclusion in *every* state health department of each of these sub-divisions. We do not question the desirability of reinforcing our central organization in this way, but looking at the cost of such reinforcement and looking again at the skeleton crew that is manning our health districts, where the real spade work of public health is being done, we are bound to pause. We believe that if eastern committees will look at the same picture they will pause too.

It is admitted that the picture could be changed by federal subsidies on a much larger scale than those granted under the present Security Act. The uncertain and spasmodic generosity of the national Congress poses administrative conundrums to all state health officers and is a more serious affliction to western health officers only to the extent that intermittent charity can be more tantalizing when the stomach is habitually empty than when it is assured of regular though limited provender.

REFERENCES

1. *J.A.M.A.*, 106:115 (Jan. 11). 1936.
2. Smillie, Wilson G. *Public Health Administration in the United States.* Macmillan, 1935.

NOTE: The above article was prepared early in 1936, before definite allocations under the Social Security Act were known. The actual allocations have been somewhat higher than those assumed in this article with the result that part-time clerks have been turned into full-time clerks and some other minor additions made to the local staffs. Also a division of maternal and child health has been established in the central administration.

Modern Trends in Nursing Education

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NURSING education is undergoing drastic changes. History repeating herself through a new social expression has kept consistently in step with the development and progress in related fields of life activity. The demand today for a different preparation for the nurse, general and professional, is a demand not of the idealist but of the times.

It is hardly necessary to trace the evolution of nursing practice from an age-old emotional expression in response to human suffering to the present-day three-dimensional demand that adds to succor the technics required for curative medicine and a program of health education for nursing in relation to preventive medicine—the third immeasurably extending the scope of activity and the social contribution of the profession.

It is said that the Americans have no plan. This I question. Consciously and unconsciously, Americans are adhering to the slow but sound democratic principle of social growth and development, namely, education of the entire population as the *sine qua non* of efficient citizenship, the cornerstone of which is physical fitness.

In no country are there greater opportunities for the realization of the "American dream—that belief in the right and possibility of a better life for all." Institutions of higher education open wide doors through which, in ever increasing numbers, the youth of the country seek fullest preparation for their chosen life activity, and throughout the country highly equipped health and social organizations and institutions offer almost unlimited opportunities, and enough graduates of the varied types of social worker to provide the personnel demanded for adequate care and direction of the people, and for the instruction and practical experience of students in their related fields.

The opportunity of the nurse in the field of health education is now generally conceded, and for such function, emphasis has been laid on the preparation of a special group designated as public health nurses. Financial provision, however, for the practice of this group, either by private philanthropy or governmental appropriation, is entirely inadequate to meet the needs of the population, whether rural, urban, or suburban. Approximately 20,000 public health nurses are now engaged in a field that 100,000 would not adequately cover. A tragedy of the day is the inadequate employment in the medical and nursing professions, the uncared-for sick, and the unattended births in the community—the latter deplorable in a century so informed on the importance of the birth episode through its influence on the mother and child and, *ipso facto,* the future generations. Fortunately there is today an awakening appreciation of the contribution

that might be made in the field of preventive medicine by this numerically strongest division of health workers, through a curriculum shaped not for a selected group but for the entire profession.

That courses in the newer sciences, sociology, psychology, psychiatry, as well as in the physical sciences, are essential for this wider interpretation of practice, either as prerequisites or in the professional curriculum, is not open to question. The content of such courses in their application to the particular field requires much study and experimentation. The same may be said of the various branches of clinical medicine, some experience in each of which is of utmost importance if the practice of the nurse is to extend through the field of curative medicine into that of preventive medicine, as it obviously should, since the opportunity of this practitioner for health education through her intimate and sometimes prolonged association with the patient and the family equals, may even exceed, that of the public health nurse.

This expansion of function in half a century of organized existence presents a problem of curriculum readjustment greatly complicated by the conditions governing schools of nursing. The first schools in this country, established on the Nightingale plan, were conceived as separate units, though closely allied to the institutions providing a practice field. The profession, however, early lost its integrity and educational freedom by the establishment throughout the country of these schools as integral departments of the hospitals—with the asset of assured support, but the predictable result, in large measure, and in many cases entirely, of the subordination of the educational program to the needs of the nursing service rendered by the student body.

The values accruing, despite the palpable defects of the educational program, are recognized, but the insistent and increasing demands from the rapidly developing field of public health for nurses equipped to meet the health as well as the sickness needs of the community could not be disregarded. The League of Nursing Education, therefore obtained a grant from the Rockefeller Foundation that made possible the first study ever undertaken, which was directed by Josephine Goldmark, in coöperation with a representative committee of which C.-E. A. Winslow, Dr.P.H., was chairman. The findings were published in 1921 under the title "Nursing and Nursing Education in the United States." Originally conceived as a study of the supplemental subject matter required for public health nursing, a superficial survey of the undergraduate courses left no question as to the need of a searching investigation of the basic professional preparation. It was determined to extend the study to include the courses offered in 15 selected schools.

This study, a classic that will stand the test of time, was shortly followed by a more comprehensive undertaking, the purpose of which was indicated by the designation of the advisory body as the Grading Committee. Again the problems involved deflected the original intent into other channels. The first report, prepared by Dr. Burgess, a highly qualified statistician, was entitled "Nurses, Patients, and Pocketbooks." This presented to an astonished public a yearly outpouring from 2,000 schools of nursing of a graduating body that had already brought the ratio of nurses to population in some states as high as 1 to 300, and that would multiply by compound interest to an astounding figure in a comparatively few years. The report further presented the low level of general education; inadequate teaching facilities as expressed in the number and preparation of instructors; theoretical and

clinical content of curriculum and teaching equipment; and other factors bearing directly or indirectly on the preparation of workers for a field of acknowledged social importance.

Under the caption "Nursing Schools Today and Tomorrow," the Grading Committee published in 1934 a report on its further findings, but did not feel it possible to fulfil the complex task for which it was created. It is a reasonable question whether, without changes acknowledged as essential but far from achieved, grading or accrediting of the schools on so unstable a basis as now exists is advisable, despite the obvious need of reliable information for candidates. The National League of Nursing Education, through its Standards Committee and in conference with experts in education, medicine, and nursing, is studying the problem and will undoubtedly develop a plan which will clarify the situation through some form of classification.

The influence of these reports was evidenced by a steady decrease in the number of schools, and the advancement of the educational requirement for admission to completion of high school, reported as 90 per cent in the second and last publication of the Grading Committee.

Concurrently with the studies of the Grading Committee in this country, studies of nursing and nursing education were conducted in England by the *Lancet* Committee, and in Canada, under the supervision of the Canadian Medical Association and the Canadian Nurses Association, by G. M. Weir, Professor of Education in the University of British Columbia. The latter brought out the most comprehensive, sympathetic, and constructive discussion of the subject that has yet appeared.

It is not necessary to discuss in detail the defects revealed in the present system of nursing education. The number of schools still existing, approximately 1,500, is suggestive of the situation, without the very definite evidence of inadequate instruction, inadequate clinical experience, and hours of physical and mental output generally conceded as detrimental to health—in short, an educational interpretation out of step with present-day social conditions, educational methods, and scientific conclusions.

Through these several studies the profession now has a foundation of facts and analyses upon which to base future plans and programs, and through which the values intrinsic in the traditional type of nursing education may not be lost, but deepened and broadened by the vitalizing current of scientific findings bearing on the human organism. To these studies also must be attributed the very definite tendency to effect connections between schools of nursing and institutions of higher education.

This trend in the United States toward a higher level of general education and a more comprehensive professional preparation, supported by the unequivocal pronouncement of the Canadian Survey of Nursing Education, and the trends in several countries on the European Continent, leave little question as to the ultimate release of the hospitals from a burden that should never have been imposed. The curriculum in preparation for nursing in the new field of preventive medicine demands that these schools find their place in the educational system of the country, and that as definite a relation to the institutions of higher education is imperative as obtains for the allied branches of medicine, nutrition, pharmacy, dentistry, and social service. No less than for the education of the community should the State assume responsibility for its health. Privately endowed or supported schools or departments would still continue but, as in the case of other professional and voca-

tional courses in these institutions, tuition fees would be required, while working scholarships, as in other branches of the arts and sciences, could and should be made available for desirable candidates during their clinical and field experience.

Though as early as 1910 the University of Minnesota had authorized the establishment of a school of nursing as a department of the School of Medicine, this control, unfortunately, hardly less than that of the hospital, subordinated the students' program of study to the demands of the affiliated hospitals for nursing service. Had the principles and provisions clearly defined by Richard Olding Beard, M.D., to whose vision this step was attributable, been adhered to, the university relationship would have had even greater significance, for it would have established as essential for sound practice the right of schools of nursing to the academic freedom accorded other professions in the development of their program of study, and through the provision of an adequate graduate nurse staff for the affiliated hospitals, insured the student the educational value of the clinical experience.

In 1934 the League of Nursing Education published a list of 136 schools connected with universities. It is understood that 165 of the 400 Catholic schools of nursing are affiliated with Catholic colleges. In many cases, both from the academic and professional standpoints, the connection is but in name. While a number of schools have been accepted as integral units of universities or colleges, the variations in the entrance requirements and the professional curriculum are great. For instance, 2 university schools require a Bachelor's degree from an accredited college for the basic course which leads to a degree of Master of Nursing; a number of the schools require 1 or 2 years of college work for admission, while others still adhere to the completion of 4 years of high school.

Highly desirable as is the movement, the effecting of the connection of schools of nursing with institutions of higher education calls for study and direction, and to meet this demand the Association of Collegiate Schools of Nursing was recently created, the objects of which, as set forth in the constitution, are as follows:

1. To develop nursing education on a professional and collegiate level
2. To promote and strengthen relationships between schools of nursing and institutions of higher education
3. To promote study and experimentation in nursing service and nursing education

In order to extend its usefulness as widely as it consistently could, provision was made by the Association for two classes of membership, active and associate. Briefly stated:

Active membership is open to an accredited school of nursing established as a constituent part of an accredited college or university.

Associate membership is open to accredited schools of nursing, the curricula of which meet the standards set by the Association of Collegiate Schools of Nursing, and that maintain a relationship with accredited colleges or universities through which their resources and facilities are available for the students.

This association, now accepted as a constituent member of the American Council on Education, has on its list the following schools and departments of nursing:

ACTIVE MEMBERS OF THE ASSOCIATION OF COLLEGIATE SCHOOLS OF NURSING

Skidmore College School of Nursing, Saratoga, N. Y.

Yale University School of Nursing, New Haven, Conn.

Catholic University Department of Nursing Education, Washington, D. C.

George Peabody College for Teachers, Department of Nursing Education, Nashville, Tenn.

St. Louis University School of Nursing, St. Louis, Mo.

Syracuse University, Department of Public Health Nursing, Syracuse, N. Y.

Teachers College, Columbia University, Department of Nursing Education, New York, N. Y.

University of Oregon, Department of Nursing Education, Portland, Ore.

University of Virginia, School of Nursing Education, Charlottesville, Va.

Washington University School of Nursing, St. Louis, Mo.

Simmons College School of Nursing, Boston, Mass.

University of California School of Nursing, Berkeley, Calif.

University of Washington School of Nursing, Seattle, Wash.

Vanderbilt University School of Nursing, Nashville, Tenn.

Western Reserve University School of Nursing, Cleveland, Ohio

ASSOCIATE MEMBERS

Duke University School of Nursing, Durham, N. C.

Rochester University School of Nursing, Rochester, N. Y.

St. Louis University School of Nursing, St. Louis, Mo.

University of Michigan School of Nursing, Ann Arbor, Mich.

University of Oregon, Department of Nursing Education, Portland, Ore.

Washington University School of Nursing, St. Louis, Mo.

Be the selected field of her practice where or what it may, every nurse needs, as an individual, as a citizen, and as a practitioner of vital social importance, a liberal education in the fullest interpretation of the term. It is frequently asserted that so prolonged and comprehensive a preparation is not justified by the rewards in nursing as expressed in financial returns, satisfactions accruing through the services rendered, and the hours of physical output. To all these arguments the reply, based on any study of human responses, should be that the higher educational level, through the stimulation of the social and physical sciences, brings an inquiring and resourceful mind to the task—a type of mind that "seeing that which is invisible" overlooks—often too greatly overlooks—conditions that early become unbearable to the arid mind of the mechanized product of a program of education that limits knowledge to the required technics. The stultifying influences of the sometimes unpleasant procedures, repetitive almost to the point of revolt, can only be overcome by an interest and purpose that holds the attention above the drudgery of the means through which the desired end must be achieved.

But is there any life activity of which this is not the case? Furthermore, in any activity in which science is concerned—and there are few in which it is not—these very procedures often assume undreamed of significance. The failure to admit the desirability of a scientifically oriented individual for the part assigned the nurse—this connecting link between the investigator and the organism with which they are mutually concerned—is difficult to understand in the light of present-day scientific knowledge and social conditions.

In view of the unemployment of the country's greatest asset, her youth, now expressed in millions; the unemployed qualified teachers; the unemployed graduate nurses; and the ever shortening span of working years; there is little excuse for the failure to require for all workers a program of education through which the country may be better served, and their own lives enriched. In the field of nursing itself there is a wealth of dormant interest awaiting the specialists who will soon supplant the outmoded classification of private duty, institutional, and public health nurse. I refer to the specialists in nursing in surgery, medicine, nervous and mental diseases, obstetrics, and pediatrics, branches which

again fall into sub-divisions requiring for the nurse, no less than the physician, a highly specialized body of knowledge and skills.

The syntheses demanded for efficient result in the field of health can be achieved only through the intelligent, collective will of the army of health workers, specialists in their own field, but all versed in scientific concepts, scientific methods, and scientific terminology, motivated by a unified objective. That such coördinated, coöperative programs be developed was the pronouncement of the Committee on Medical Care for the American people.

An important step, and one that further emphasizes the need of broadening the content of nursing education, is the effort to persuade nurses, professionally so highly organized, to organize for service through local community programs based on the needs of and open to the entire population. To this end the national nursing organizations have recently appointed a committee that has outlined as basic the following principles:

1. That a responsible group, representing the nursing profession, the medical profession, and such lay groups concerned with nursing as hospital boards, schools of nursing committees, boards of public health nursing agencies, etc., work out plans in each community for a community nursing program.

2. Analyzing community nursing problems include:

a. How much nursing care is needed for different types of situations

b. What are the present facilities

c. What are the gaps and duplications as shown by "a" and "b"

3. Meeting community nursing needs involves:

a. Reducing the number of agencies which distribute nursing service to as few agencies as possible and providing one coördinating agency through which all types of nursing service may be obtained

b. An understood relationship and division of responsibility between the various nursing facilities

c. A concerted effort to fill in gaps and eliminate duplication

d. The establishment in every community of some type of machinery for supplying nursing service

In the Canadian Survey of Nursing Education will be found a comprehensive and suggestive consideration of municipal support and administration of community nursing service.

Of wider significance than is at first apparent are these 2 progressive steps—the attainment for schools of nursing of the rights and privileges of higher education; and the integration, for local community service, of the contributions of the members of the nursing profession.

The national and international significance of the health movement, to the furtherance of which throughout the world American citizens have so greatly contributed, cannot be overestimated, and not only through the prevention of disease that takes no cognizance of national boundaries, but through the underlying emphasis on the value of every human life as such, provided only that through heredity and environment the organism shall be well born.

Through an International Council of Nurses, American nurses have long since established professional relationships on all continents. Through the Division of International Studies of the Rockefeller Foundation, nurses from many countries have been enabled to study—through undergraduate and graduate courses, and through visits to American institutions and organizations—nursing education and nursing service in the United States. It is eminently fitting that the International Council of Nurses and the League of Red Cross Societies should unite to establish a Florence Nightingale Memorial Foundation, and that this memorial should take the form of courses for international students under the auspices of the University of London in coöperation with the hospitals and social or-

ganizations of the city in which was offered the first and world renowned professional program of nursing education. Never in the history of the world was there a more timely moment to further a project so consistently expressive of the potential value of every human life.

As in all professions, the responsibility for the interpretation of function, and the acquirement of the educational content demanded for the fulfillment of such function, rests upon nurses themselves. However obscured may be the public's understanding of the part of nursing in social reconstruction, nurses themselves, to whom the mental, physical, and social crippling of humanity is an open book, cannot plead ignorance, but, as an inalienable right, should demand the educational content through which their most effective service may be rendered and the means through which such service may be universally available. Not less than for their educational needs should the country assume responsibility for the health of her children.

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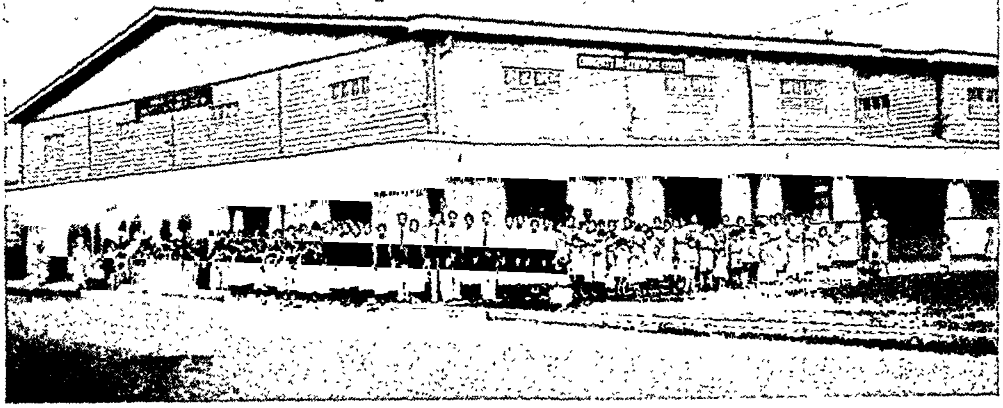
The Medical Profession

I SAID our profession was a holy office on the same level as that of the priest if not higher, where surplus money-making should be forbidden by law. The doctors should be paid by the State and well paid like the judges in England. Those who did not like this arrangement should leave the profession and go on the Stock Exchange or open a shop. The doctors should walk about like sages, honoured and protected by all men. They should be welcome to take what they liked from their rich patients for their poor patients and for themselves, but they should not count their visits or write any bills.

What was to the heart of the mother the value in cash of the life of her child you had saved? What was the proper fee for taking the fear of death out of a pair of terror-stricken eyes by a comforting word or a mere stroke of your hand? How many francs were you to charge for every second of the death-struggle your morphia syringe had snatched from the executioner? How long were we to dump on suffering mankind all these expensive patent medicines and drugs with modern labels but with roots sprung from medieval superstition? We well knew that our number of efficacious drugs could be counted on the ends of our fingers and were handed to us by benevolent Mother Nature at a cheap price.—Axel Munthe, *The Story of San Michele*, 1930.



Santa Cruz Community Health-Social Center

Community Public Health Nursing in the Philippine Islands

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PUBLIC health and welfare work in the Philippine Islands has been supervised by Americans during the entire period of more than 35 years of American occupation. During recent years supervision has been exercised by an American Governor-General, an American cabinet member, and an American technical adviser. On November 15, 1935, when the new Commonwealth Government was inaugurated, control by Americans, or by the United States Government, of health and welfare activities ceased. The public health nursing work described in this article represents the latest and the final move made by the former government to advance the cause of public health and welfare in the Islands.

Manila is a city of approximately 350,000 inhabitants. It is an oriental community in which the wealthier people maintain a standard of living similar to that prevailing among the same class in occidental countries, but where the poorer class lives on a standard but little if any above that obtaining for similar groups in other oriental cities.

The average family living in Manila must have a family income of at least 30 pesos ($15 gold) per month in order to maintain the minimum normal standard of living. While no census has been taken, it is estimated that at least 10,000 families living in Manila have a family income of less than 30 pesos a month and that of these families at least 6,000 have a family income of not more than 15 pesos ($7.50 gold) a month. As in all cities, the families having an abnormally low standard of living have been crowded into the less desirable portions of the city where they live in a slum environment and under adverse social conditions.

Prior to 1934, no public health

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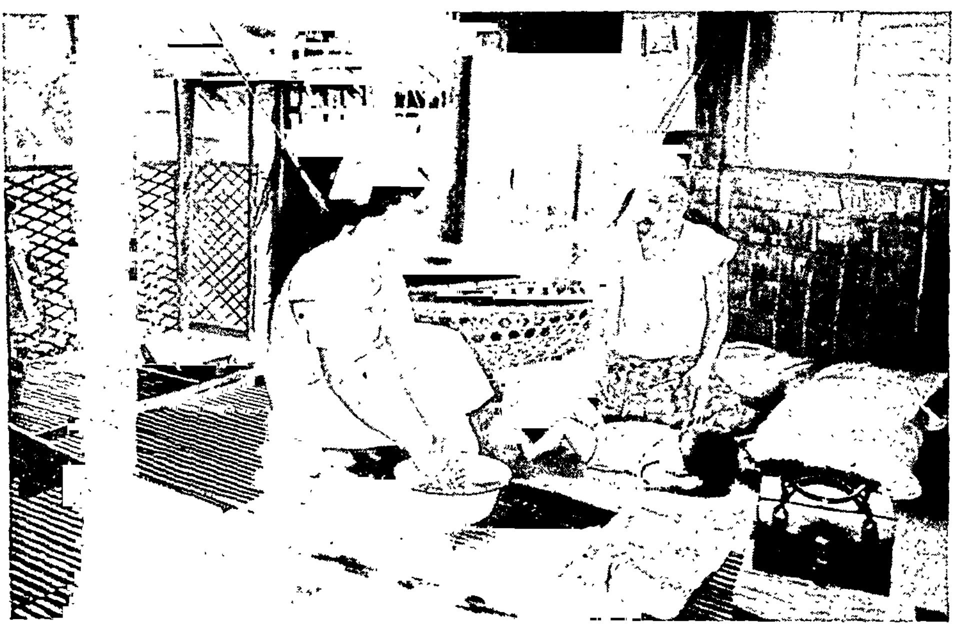
A nurse visiting a home in Tondo slums

nursing service was available for the slum population of Manila, and there was no other agency by which instruction in health matters could be given to these people in their own homes. Consequently, but little if any progress was being made in the control of such diseases as tuberculosis, malnutrition, or intestinal parasitism. As only very meager facilities were available for the promotion of maternal and child health work among the members



A nurse showing a mother how to care for a sick child in a typical native home. The bamboo platform is the bed. Note the swinging bamboo cradle.

of this group, the infant mortality rate remained high, with no prospect of its being reduced.

The Bureau of Health of the Philippine Government has maintained a public health nursing service for a number of years, but prior to 1933 the bureau was so organized that such service was entirely inadequate. However, a reorganization of the health and welfare activities of the government which became effective on January 1, 1933, made it possible for public health nursing service of the bureau to be extended and coördinated with the other activities of the bureau. Following the reorganization, studies and surveys were made which showed that under the conditions existing in Manila a combined public health nursing service and social service offered the most feasible method of solving the public health problem discussed above. Consequently, the Bureau of Health developed a program of public health nursing and social service to meet the urgent need for health work in the homes of the poor people living in the congested districts of the city.

The fundamental principles of public health nursing are, of course, the same in Manila as they are in occidental countries, but the methods employed in applying these principles are modified by the local environmental factors and customs. The climate is tropical. The great majority of the houses of the poorer class are nipa huts, constructed of bamboo and roofed with nipa—the so-called light material houses. A smaller group of this class of the population live in stone, brick, or wooden houses, usually known as strong material houses.

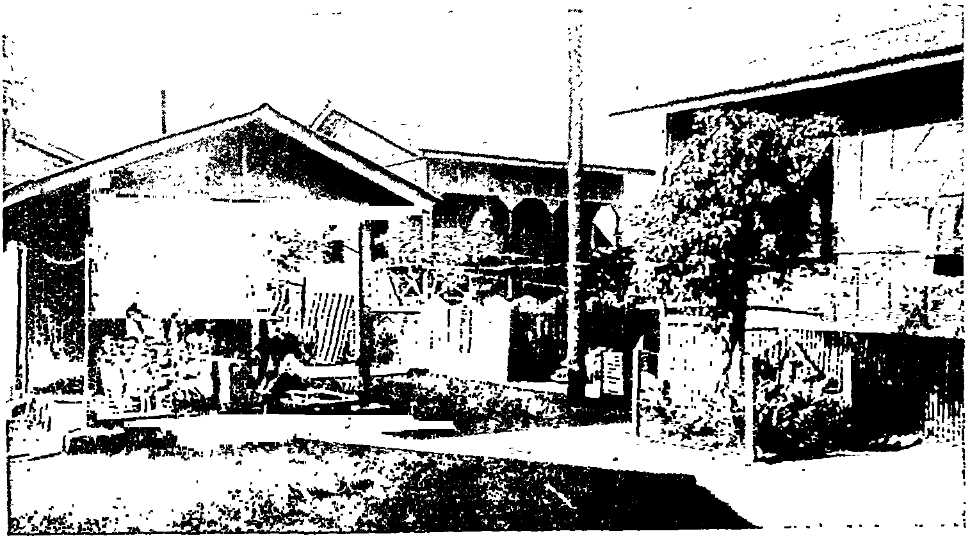
The dietary customs of the people constitute a serious health problem. The poor people subsist mainly on rice and fish with an inadequate quantity of fresh vegetables or fruits. Moreover, rice and fish are the preferred articles of diet, and the exclusion of other foods from the diet is frequently due to custom, and not entirely to poverty. Because of the defective diet, conditions due directly or indirectly to malnutrition are prevalent, particularly infantile beriberi and a lowered resistance to tuberculosis and other infectious diseases.

Family ties are strong among the Filipino people, and in many instances the family group is enlarged by relatives other than the immediate members of the family. The result is that the nipa huts, or the rooms of the strong material buildings, are crowded, with the consequent adverse health and social effects.

Because of the climatic conditions and poverty a large proportion of the children, and the adults as well, of the poor families do not wear shoes, or do so only at intervals. Consequently, infestation with hookworm is prevalent. Also, the customs which govern the preparation and handling of the food result in a high rate of infestation with ascaris. Surveys show that about 85 to 90 per cent of the population are infested with hookworm or ascaris, or both.

In order to meet this situation, community health centers were established in the affected districts, known as community health-social centers. The community health-social center, as it is conducted in Manila, is an agency designed to provide a combined health and social service, with the family as the unit served. The nursing and social service personnel consists of nurses trained in public health nursing and in social work. The clinics are conducted by physicians, each of whom has had special training in the particular work concerned.

Each center is composed of 4 basic sections, with such additional activities as may be required by local conditions. These sections are: social rehabilitation,



1. Model houses, part of the housing project in connection with Tondo Community-Social Center. 2. Nurse visiting a home of nipa construction. 3. Nurse visiting a home on Manila waterfront. 4. A corner in the Tondo slums.

child and maternal health, tuberculosis, and the general dispensary. A dental service is also provided for each center.

The basic functions of a community health-social center are the operation of clinics at the center and a home visiting service. There is a general clinic for the treatment of all kinds of cases; postnatal and prenatal clinics; a tuberculosis clinic; clinics for infants, and well baby clinics. These are held daily or at scheduled intervals. All service is free.

Home visiting by nurses is considered to be the most important activity of a community health-social center, because the fundamental function of the center is to carry health and social services into the homes of the people. The clinics conducted at the center are secondary in importance to home visiting.

In the operation of the home visiting services, the quality rather than the volume of the work performed is emphasized. This must be so if good results are to be obtained under the prevailing conditions. Follow-up work is essential to success and the nurse must visit a home many times in order to obtain the desired results. Ignorance is rife and many conditions favorable to the spread of disease prevail in the homes. Customs inimical to health must be changed. Finally, the mother rules the Filipino family in all matters that pertain to the home, and the mother must be taught in her own home how to protect the health of her family.

In order to insure that the home visiting work will be effective, the district served by a center is limited geographically to that which can be covered efficiently by the nurses available. Each nurse is assigned to a zone within this district and she is responsible for the home visiting work within that zone. The case load for a nurse is limited to the number of families which can be served effectively under the local conditions—usually an average of 10 home visits per day. The nurses do not make visits outside the geographical limits of the center districts. Experience has shown that when this is permitted the quality of the service rendered deteriorates.

Patients and personnel at the San Nicolas Community Health-Social Center

The centers are also utilized for the dissemination of instruction in health matters to groups, especially to mothers. Group instruction in prenatal and postnatal care and in the care of infants is given to pregnant women by trained workers. Cooking classes are held at regular intervals where practical instruction is given not only in cooking, but also in other phases of nutrition. Training in simple sewing is also provided for mothers. Reading and writing are taught to illiterate adults. Kindergarten classes are provided for the children of poor families as a means of attracting the parents to the center and obtaining their coöperation.

In 1934 sufficient funds were obtained from various sources for the operation of two community health-social centers. One was located in the Tondo and the other in the San Nicolas slum districts of the city. These centers were more or less experi-

mental in nature, particular attention being given to the development of procedures and technics adapted to local conditions. The success attained by these two centers during 1934 induced the Legislature to include the sum of $45,000 (90,000 pesos) in the budget of the Insular government for the operation of community health-social centers during 1935. A like sum has since been appropriated in the insular budget for 1936. The appropriation of funds as budgetary items instead of by a special act means that the appropriating authorities recognize that the work is a permanent activity and that it should be continued from year to year in the future. With the additional funds two other community health-social centers were established in the congested districts of Manila in 1935—making four in all. The new centers were located in the Santa Cruz and the Sampaloc slums.

The normal duty staff of each of the centers, as they are now organized, consists of 3 full-time physicians, 1 half-time physician who is a specialist in tuberculosis, 10 nurses, and the necessary attendants. One of the physicians serves as chief of the center, and 1 of the nurses as chief nurse. There is also the chief of the centers who is a physician trained in public health and sociology and who supervises the technical and administrative activities of all the centers in order to secure uniformity of procedure and coördination of all activities. He is assisted by a chief nurse for all the centers.

The objective of the work of the community health-social center is to effect the health and social rehabilitation of the family. Among the poor people of the Philippines the margin between destitution and a degree of prosperity which will permit the family to have a normal standard of living is so narrow that health work cannot be separated from social service. Frequently, in order to effect improvement in the health of a family, it is necessary to rehabilitate the family economically and socially. Material relief in the form of food or money may be required. It may be necessary to obtain better housing conditions, or to find employment for a member of the family. If this is not done the health measures which might be undertaken will have but little effect. Under these conditions, health work and social service must go hand in hand and the family as a whole, not the individual member of the family, must be regarded as the case.

The Tondo community health-social center is also a training center for nurses who are to be assigned to public health nursing work in other centers or in the provinces. The training consists largely of practical field work in public health nursing and social work. The center is provided with additional personnel for this purpose.

Table I shows in summary form the work that has been done by the community health-social centers in Manila during the 9 months, January 1, 1935, to September 30, 1935.

The work of the community health-

TABLE I

WORK PERFORMED BY THE FOUR COMMUNITY HEALTH-SOCIAL CENTERS IN MANILA DURING THE PERIOD OF JANUARY 1, 1935, TO SEPTEMBER 30, 1935

	Tondo	*San Nicolas*	*Sta. Cruz*	*Sampaloc*	*Total*
Number of families registered	4,073	3,474	3,527	3,417	14,491
Number of visits to homes	11,223	10,129	10,279	8,890	40,551
Number of individuals attending the center clinics	40,134	26,317	29,008	24,082	119,501

social centers in Manila has also influenced the development of a public health nursing service in the provinces. The Legislature appropriated the sum of $85,000 (170,000) pesos) for this activity in 1935 and a like sum for 1936. These appropriations were also made as budgetary items, and it is probable that they will be continued in the future. Public health nurses have been sent to 149 of the more backward barrios (villages) in the provinces and in addition 26 supervising nurses have been assigned to supervise and guide the barrio nurses. This work has been started only during 1935.

Antityphoid Inoculation

". . . During the Great War antityphoid inoculation by the subcutaneous route was a proved success; the incidence of enteric fever amongst the inoculated was little, whereas the uninoculated suffered severely. Oral vaccination against typhoid fever is now having a considerable vogue and yielding in some areas a more or less satisfactory experience. It is too soon to compare the relative values of oral and of subcutaneous methods of antienteric vaccination, because the former has not had the extensive field trials of the latter. Whatever value oral immunization may ultimately be proved to have, it is certain that 'subcutaneous inoculation has a definite methodical advantage, *i.e.*, dosage; in attempted oral immunization imperfect absorption of the antigen from the alimentary canal must occur frequently.

"I have encountered typhoid fever in persons 'immunized' comparatively recently with Besredka's typhoid pills *per os*. On the other hand, during the Dardanelles campaign I saw practically no true typhoid fever although there was every opportunity for its spread. The troops in the area had been inoculated in 1915 with antityphoid vaccine only, and not with triple (T.A.B.) vaccine, which fact accounted for the comparatively high incidence of paratyphoid fevers and the absence of typhoid fever itself. In 1916, when we returned to Egypt from Dardanelles, T.A.B. vaccine became generally available to us. Subcutaneous injection of this triple vaccine had the effect of eliminating almost entirely both typhoid and paratyphoid fevers. . . ."—William Campbell, B.Sc. (Public Health), M.B., Ch.B., F.R.S. Some Public Health Aspects of Immunity. *J. Roy. San. Inst.*, June, 1936, p. 815.

Lead Pipes as a Source of Lead in Drinking Water

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THE literature is quite replete with reports of lead poisoning, and not the least common source is water. In some instances the occurrence of lead poisoning from water has been so extensive as to be spoken of as an epidemic. The reported occurrences seem to be most numerous for Europe, and in the United States for the New England states. It is common knowledge that the use of lead pipes in connecting the mains to the domestic pipe lines is a usual practice. Furthermore we are aware of the fact that in some communities, many domestic service pipe lines are of lead throughout.

It seems entirely plausible that the sporadic cases of lead poisoning, and possible illnesses that are not diagnosed and recorded at all, may be due to a number of circumstances connected with lead service pipes. If water is permitted to remain at rest in a lead pipe, the quantity of lead dissolved is definitely increased—the time allowed may be only over night, a week end, a week, or it may be months. In any event, does the occupant of a dwelling, deliberately and methodically flush the line to the extent that practically all the excess dissolved lead is removed before a drink is drawn? If such precaution is not taken, it seems entirely possible that that portion of water standing in the lead pipe, even though it be only the connecting link between main and domestic line, may just reach the faucet in time to empty into a drinking glass.

In this investigation, an attempt has been made to simulate the actual conditions extant in our water supply systems. Samples of water have been permitted to remain in contact with lead pipes for varying periods of time, much as would be the case if the occupant of a dwelling were absent and upon his return would remove the water, perhaps for drinking.

EXPERIMENTAL

The methods of analysis adopted by the authors were: (a) the titrimetric extraction with diphenylthiocarbazone,[1] and (b) the colorimetric method based on the use of diphenylthiocarbazone.[2]

The lead pipes in which water was placed for known periods of time were 1¼" inside diameter and of composition and treatment specified by the Department of Water Supply, Gas and Electricity of the City of New York. The pipes were cut to 5′ lengths for convenience in handling, and were equipped with rubber stoppers and an escape vent to avoid trapped air in the test water. The capacity of each was 1,670 c.c. Before each pipe was used it was scrubbed with soap solution containing powdered pumice and thoroughly rinsed. Throughout the tests the pipes

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TABLE I

CHARACTER AND SOURCE OF WATER SAMPLES

Sample	Source	Hardness [2]	Alkalinity [2]	Domestic Pipe Line
A	I	21	10	Steel
B	I	21	10	Lead
C	[1] I & II (mixed)	Ave. 37	Ave. 16	Steel
D	[1] III & IV "	Ave. 302	Ave. 160	Brass
E	V	417	30.7	Steel
F	I	21	10	Lead

1. C is a mixture of soft waters of low alkalinity; D of hard waters of relatively high alkalinity.
2. Data reported by the Department of Water Supply, Gas and Electricity of the City of New York.

were kept filled with water and never permitted to dry during the removal of samples.

The sources of water samples collected in the City of New York are here identified as Catskill (I), Long Island (II), Flatbush well No. 16 (III), Flatbush well No. 20 (IV), and Flatbush well No. 30 (V). In order that each sample may be more specifically identified, the condition of the domestic pipe line is also recorded in Table I. Each sample is from an active pipe line and the specimen taken for treatment and analysis represents water that might have been drawn for drinking purposes.

Part of each sample of water was concentrated (2 liters to 500 c.c.) and analyzed for its lead content as received from the faucet at the source. Table II shows these results.

TABLE II

ANALYSIS OF WATER AS RECEIVED, EXPRESSED AS MG. OF LEAD PER LITER (AVERAGE OF FIVE OR MORE SAMPLES)

A	B	C	D	E	F
0.025	0.15	0.028	0.068	0.071	0.135

TABLE III

ANALYSIS OF WATER EXPOSED TO LEAD IN LEAD PIPES FOR DEFINITE PERIODS OF TIME

Sample	Pipe No.	Date Drawn	Days Exposed	Mg. Pb. per Liter
A	1	1- 4-36	7	1.050
A	1	1-11-36	7	1.346
A	2	1-11-36	7	2.220
A	1	1-28-36	7	1.317
A	2	1-28-36	7	1.465
A	1	1-25-36	14	2.160
A	2	1-25-36	14	2.247
B	1	11-12-35	11	0.656
B	1	12-10-35	18	0.901
B	2	12-10-35	18	0.953
C	1	11-11-35	7	1.412
C	2	12-28-35	7	1.315
D	1	12-10-35	7	1.100
D	2	12-10-35	7	0.903
E	1	12-17-35	8	1.293
E	2	12-17-35	8	1.369
A	3	1-18-36	7	3.378
A	4	1-18-36	7	3.670
A	3	1-25-36	14	4.420
A	4	1-25-36	14	4.722

Water from source F was not subjected to the lead pipe treatment because of inconvenience in securing samples.

The remainder of each sample was exposed to lead of lead pipes for a known period of time at room temperature and then removed for analysis. Table III displays these results. Each pipe was refilled immediately after the sample was removed. The samples are identified by the letters A to F as in Tables I and II and are reported as mg. lead per liter in the water exposed to lead in a 5′ pipe of 1.67 liters capacity.

With the exception of the last four observations, the pipes used had been exposed to water for at least 60 days before the observations reported in Table III were made. Water exposed to lead in new lead pipes dissolved comparatively great quantities of lead. A sample (A) withdrawn from a new pipe at the end of the first 20 days contained 73.75 mg. per liter. Another sample (A) withdrawn at the end of 38 days' exposure in a second new pipe contained 66.40 mg. lead per liter.

The last four observations in Table III were made with new pipes which had been exposed to three changes of water for 7 day periods each.

The U. S. Public Health Service states that lead in natural water "shall not exceed 0.1 p.p.m."[3] Samples B and F, Table II, exceeded that limit for the particular samples analyzed. Of particular interest is the fact that Waters A and B are from the same source (Catskill) but B came through an all lead domestic service pipe system, while A came through steel pipes. Table III indicates the conditions that might develop if the service pipes were not in active use for the periods indicated and 5′ or more of lead pipe constituted part of the pipe line. Continuous flow, agitation, and diffusion all tend to prevent the development of such situations. The observations reported here make it appear quite obvious that domestic service pipe lines made entirely or even in part, of lead should be thoroughly flushed after a period of rest before the water is used for drinking or for cooking of foods.

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Sixtieth Anniversary of American Chemical Society

CHARLES EDWARD MUNROE, eighty-seven years old, who all his life has worked among explosives, is the sole surviving charter member of the American Chemical Society, which at a national meeting in Pittsburgh, September 7–11, will celebrate the sixtieth anniversary of its founding.

The American Chemical Society, largest professional organization of its kind in the world, was organized in New York April 20, 1876. John W. Draper was the first president. Dr. Munroe was one of the original 183 members.

Three other members, J. B. F. Herreshoff, William H. Nichols, and H. E. Niese, maintained an unbroken connection with the American Chemical Society for more than fifty years.

Integrated Control of Occupational Diseases*

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SURELY no proof is needed for the establishment of the socio-economic importance of occupational diseases, at least for those who have been reliably informed of our recent experiences.

It is also axiomatic that control and prevention are far superior to cure, viewed from any of the aspects concerning occupational disease problems.

Others have covered the medical and engineering control of occupational diseases. What I shall attempt to do, therefore, will be to bring together and integrate these methods of control—mention some of the technical difficulties which have arisen, consider practical applications of methods in the different groups interested, speak briefly concerning the evolution of control, and, finally, attempt to come to some rational conclusions and recommendations.

CONTROL METHODS

In considering the *engineering control methods,* we are concerned, (A) with the basic principle of first investigating occupational conditions; (B) measuring the severity of the hazard scientifically, then assessing the hazard; and (C) instituting the indicated measures which have been evolved. These control methods include: (1) a physical and hygienic survey of plant conditions; (2) occupational history and analysis of employees; (3) adequate information concerning the materials and processes used: (4) atmospheric and gross sampling of materials, associated with quantitative physical and chemical determinations; (5) the rating of the hazard by comparing the findings in a given instance with accepted criteria; (6) an assessment of the efficiency of protective apparatus and devices; and (7) an adequate and proper interpretation of this information, so that it can be practically applied to the industrial problem involved.

If the above procedures give information which indicates the necessity of using various methods of protection, the following have been found useful in different combinations: (1) the use of mechanical devices, such as exhaust ventilating systems, respirators, masks, or helmets; (2) the changing of processes; (3) the substitution of non-toxic materials for those of proved toxicity; (4) educational programs; and (5) the continued maintenance and checking of the efficiency of protective equipment.

It is not claimed that the above list is exhaustive; there may be other measures of equal importance, but it is believed that the principal ones have been mentioned, and it is also known that they have been used successfully.

The *medical methods of control* are

* Read before the Industrial Hygiene Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 9, 1935.

likewise well known, but will be mentioned briefly: (1) preëmployment physical examinations, with which is associated a thorough occupational history going back if possible for a period of 10 years; (2) periodic examinations of employees in so far as this is possible, but especially in instances where known hazards exist; (3) laboratory examinations, both in preëmployment and periodic examinations, to obtain evidence supplementary to physical examinations, and to determine whether the applicant or employee shows signs of the effects of occupational exposure; (4) educational programs, constantly acquainting employee and employer with the need for the use of medical control procedures; and finally (5) continuous and careful medical supervision, involving the principles of employee-placement and adjustment, as well as continued study of environmental conditions and the proper functioning of protective mechanisms.

It will be seen that the object of engineering measures, simply stated, is to estimate the severity and nature of the hazard presented and to recommend the use of methods in the industrial environment to control such hazard, while the object of medical procedures is to determine the nature and extent of the effects of the environment on the bodies of the exposed employees and, similarly, to recommend and institute measures for control and prevention.

TECHNICAL DIFFICULTIES

Although it will not be possible to discuss all the technical difficulties, emphasis will be placed upon the lack of proper coördination or integration of engineering and medical methods of control and the results thereof. It often happens, for instance, that the assessment of hazards in industrial environment is interpreted entirely separately from medical findings on employees in that environment. Contrariwise, it more frequently occurs that the medical data constitute the sole evidence upon which judgment is made as to the existence of potential occupational disease hazards.

The fallacy here is evident, because occupational disease is the direct result of exposure to deleterious conditions, materials, or processes found in an industrial environment. There is, therefore, a distinct cause-and-effect relationship, which cannot be efficiently used unless the interpretation of this cause-and-effect relationship is made by a thoroughly qualified person who understands the evaluation of an occupational disease hazard in terms of its effects upon the human body.

We cannot expect that the engineer will be able to do diagnostic work—nor should he be expected to understand the application of the fundamental principles of industrial toxicology—although in some instances he may be able to tell what will probably take place under certain conditions; likewise, in most instances, the industrial physician, who has had little training in or contact with the engineering principles of industrial hygiene, will not fully appreciate the importance of the environment as an etiological factor in the production of occupational diseases.

We thus have a condition in which the engineer is interested in his side of the work, chiefly the industrial environment, and the physician, largely with diagnostic problems. The result has been a lack of real coördination and integration of causal factors with physiological functions of exposed employees.

This lack of integration has been because of the scarcity of what we might call "qualified interpreters" who understand and appreciate the principles involved on both sides of this question and are able to make inter-

pretations in simple terms, so that this combined information may be issued to, and used by manufacturers, insurance companies, attorneys, and others to whom it is of vital concern.

The physician-industrial hygienist is probably the one specialized type of person who can adequately take the responsibility for this situation. Unfortunately, few of these have been developed, and in order to make usable the information gained by application of the methods of control of occupational diseases, we cannot depend entirely upon those few who have fortunately been able to secure training both in the fundamentals of medicine and industrial hygiene.

It is obvious that we cannot expect engineers to become physicians; it does seem reasonable, however, to expect the industrial physician to superimpose upon his medical background and experience at least an appreciation and working knowledge of the principles of industrial hygiene to the end that he may be in a position to integrate intelligently the etiologic and pathologic factors concerned in occupational diseases. Certainly, the majority of occupational disease problems which come up for final decision are medical in aspect, and it seems rational to say that the physician must, in the final analysis, take the responsibility for these decisions. Examples of the smooth functioning of such a principle are to be found in the work of the Office of Industrial Hygiene and Sanitation, U. S. Public Health Service, and the Bureau of Occupational Diseases, State Department of Health of Connecticut, where the technical and administrative policies of the group are under the guidance and control of an experienced medical officer.

As Glenn Frank has so well stated:

> The future of America is in the hands of two men—the investigator and the interpreter. We shall never lack for the administrator, the third man needed to complete this trinity of social servants. And we have an ample supply of investigators, but there is a shortage of readable and responsible interpreters, men who can effectively play mediator between specialist and layman. The practical value of every social invention or material discovery depends upon its being adequately interpreted to the masses. Science owes its effective ministry as much to the interpretative mind as to the creative mind. The knowledge of mankind is advanced by the investigator, but the investigator is not always the best interpreter of his discovery. Rarely, in fact, do the genius for exploration and the genius for exposition meet in the same mind. . . . The investigator advances knowledge. The interpreter advances progress. History affords abundant evidence that civilization has advanced in direct ratio to the efficiency with which the thought of the thinkers has been translated into the language of the workers.

It has seemed to me that the regular routine physical examination must undergo considerable adjustment before it can be properly applied to occupational disease potentialities, both in the routine examination before employment and during employment on hazardous jobs. The physician surely should have in mind those conditions and defects which may become aggravated by the specific exposure which the employee meets. The physical examination should always be interpreted in the light of the possible effects of industrial environment. In other words, the physician should take into account particularly the nature and severity of the hazard presented, in evaluating the defects or abnormal conditions found on physical examination This would appear to be a more intelligent application of the industrial physical examination than has been widely and generally made.

To apply these principles successfully, the examining physician should be able to give an intelligent answer to the following questions: (1) Do you know the nature and severity of the

occupational hazard into which the examinee is going? (2) Are you satisfied that the examinee does not possess any abnormal conditions or defects which might be aggravated by occupational exposure? (3) Do you know the nature of the protective devices which are provided for the use of the employee and whether such devices are known to function properly?

Through intelligent interpretative comments in the answer to these questions, the physician can serve industry much more efficiently than he usually has done in the past.

PRACTICAL APPLICATION OF METHODS

In applying the principles of coordination and integration to the more efficient use of information regarding the control of occupational diseases, we are confronted with the problems of manufacturers, insurance companies, attorneys, and industrial commissions. We cannot entirely separate the problems of legal and compensation aspects from those of prevention and control, for we learn preventive methods largely through the so-called "trial-and-error" system. What we know about preventive medicine, for instance, was largely gained through repeated and collected experiences concerning disease manifestations and the ways in which they have been contracted. This principle applies no less to the prevention and control of occupational diseases, and it is necessary that preventive methods be developed through continuous observation and study of the avenues through which they develop; in other words, in our time at least, it will be impossible to divorce the study of the occurrence and effects of occupational diseases from that of their prevention, if advancement is to be accomplished.

It means practically nothing to the manufacturer to tell him that he has air in which there are 50 million dust particles per cu. ft.; that the free silica content of this dust amounts to 35 per cent; and that a particle-distribution study shows the majority of the particles to be below 3 μ in greatest diameter. Nor does it do him much good to find out that he has, in certain processes, a lead-in-air content of 10 mg. per 10 cu. m. of air, or a concentration of 1,500 p.p.m. of carbon monoxide. What the manufacturer wishes to know is the significance of these figures and what they mean in terms of possible disability among his employees. Someone must explain these things to him promptly and plainly.

Insurance company representatives, including engineers, claim men and underwriters, ask the same questions. The engineers want to know just what exposure would be safe. The underwriting group wants to know whether Plant A, as surveyed, is a good risk to put upon the books.

Attorneys and members of industrial commissions desire to know whether a given set of industrial conditions is an actual occupational disease hazard, whether the employee actually has the occupational disease in question, and whether such disease was contracted in the plant where the employee recently worked.

All of these are definite, practical problems regarding the etiology of occupational disease and its manifestations. If we can so assemble our information that we come to reliable conclusions and make these available, industrial medicine and hygiene will have performed a signal social and scientific service.

Clearly, the rational basis for intelligent underwriting and compensation for occupational diseases lies in obtaining over a period of many years, adequate and continued records of industrial exposure and its effects in producing disease and disability. This may

take considerable time, effort, and patience.

EVOLUTION OF CONTROL MEASURES

It is my belief that we are in an evolutionary period regarding occupational diseases. If we look back on our experience with fires, we find a prototype of this evolutionary process. In the beginning, there was no fire insurance and great losses were suffered. Eventually a system was provided by which one could insure against fire and the losses resulting. People discovered that in many cases it was not possible to recover the total loss suffered. After years of this experience, someone developed the idea that fire prevention was less costly than expecting to recover losses through insurance, although it was advisable both to carry coverage and prevent fires. Today we have developed many methods for the prevention of fire, as well as having improved in our ways of fighting fires. We can draw a similar analogy between the evolutionary processes of occupational diseases and those of accidental injuries. Time was (and probably still is, in some quarters) when those in authority believed that the effects of accidental injuries may be fully covered by insurance. This conception has gradually given way to the principle of accident prevention, which, while not fully developed, has gone a long way.

We shall probably have to learn the same lessons in occupational diseases that have previously been taught to us regarding fires and accidental injuries. Prevention is by far the most economical procedure, viewed from any angle.

CONCLUSIONS AND RECOMMENDATIONS

We may conclude that there is great need for more extensive use of the principle of integration in associating information and coming to more reliable conclusions regarding the causes and effects of occupational disease—such results to be applied in their prevention and control.

Such action would involve the training and employment of greater numbers of those whom we have been pleased to call "qualified interpreters," or, a combination of the following: (1) the use of consultants and advisers by manufacturers in working out their problems of occupational disease prevention and control; (2) adaptation of available personnel to the work of insurance companies, in respect to industrial investigations, claims problems, and the underwriting of future risks; (3) the development of more scientific medico legal principles in the handling of legal and compensation problems; (4) the further enlightenment and training of engineers, physicians, insurance company representatives, attorneys, industrialists, industrial commissions, and associates, through periodic conferences, meetings, and lectures.

If I have appeared to be presumptuous and have trod upon traditions and disturbed old trains of thought, we can take courage from the words of Henry Thomas Buckle:

> For the great enemy of knowledge is not error, but inertness. All that we want is discussion and then we are sure to do well no matter what our blunders may be. One error conflicts with another, each destroys its opponent, and truth is evolved. This is the course of the human mind, and it is from this point of view that the authors of new ideas, the proposers of new contrivances, and, the originators of new heresies, are the benefactors of their species. Whether they are right or wrong is the least part of the question. They tend to excite the mind; they open up new faculties; they stimulate us to fresh inquiry; they place old subjects under new aspects; they disturb the public sloth; and they interrupt rudely, but with most salutary effects, that love of routine which, by inducing men to go groveling on in the ways of their ancestors, stands in the path of every improvement, as a constant, and outlying, and too often, a fatal obstacle.

Detailed Study on Diphtheria Immunization*

With the One Dose Alum Precipitated Toxoid

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THIS study was made on 3 separate groups of school children, primarily of the first 3 grades, and was for the purpose of determining the efficacy and permanency of immunization against diphtheria by means of a single dose of 1 c.c. alum precipitated toxoid. It was conducted by individuals having had extensive experience in this work since the inception of active diphtheria control measures in Ohio. The toxoid used was from regular lots passed and approved by the National Institute of Health, Washington. Schick test control was not used, inasmuch as the Schick material was a non-peptone base, and 5 days elapsed between test and interpretation of reactions.

The discussion of Groups A and B in considerable detail has already been reported by Dr. Pansing.[1] The reader is referred to this publication for details pertaining to this study.

Group A—This group of 527 children was given the original Schick test September 13, 1933. On September 18, 1933, 468 were found to be Schick positive and were given 1 dose of 1 c.c. alum precipitated toxoid. On October 16, 1933, or 28 days after the toxoid was given, 462 of these children were retested with the following results: 388, or 84 per cent, were Schick negative, and 74, or 16 per cent, were Schick positive. Carrying through our original group the 74 who were Schick positive were retested for the third time at the end of 60 days to determine if there was any increase in the number rendered Schick negative after the 28 day period. This showed that only 7 children had changed from positive to negative Schick reaction at the end of 60 days.

Group B—This group of 570 children was entirely new, from different schools, and was given the original Schick test January 23, 1934. On January 29, 1934, 495 were found to be Schick positive and were given 1 dose of 1 c.c. alum precipitated toxoid. This second study was for the purpose of confirming the technic and results obtained on Group A. On April 4, 1934, or approximately 60 days after injection, 445 of those receiving treatment were retested, with the following results: 363, or 86 per cent, were found to be Schick negative, and 82, or 14 per cent, were Schick positive. It was found in some schools that as high as 96.5 per cent, and in others as low as 79 per cent, were rendered Schick negative on the 60th day after inoculation.

Group C—Those children who were

* September 13, 1933–December 4, 1936.

recorded as being Schick negative from both Groups A and B comprised the final group study, which represents only those children who were recognized to be positively Schick negative 2 years prior to the time of conducting the Group C study.

It is desired to emphasize the fact that Group C, on which the final study was made, consisted of children all of whom were Schick negative 28 or 60 days following 1 dose of 1 c.c. alum precipitated toxoid. It is shown in this final study that 57.8 per cent of a group of 549 Schick positive children who showed Schick negative 28 or 60 days following administration of 1 dose of 1 c.c. alum precipitated toxoid, reverted to Schick positive after 2 years. This surely is conclusive evidence that the early protection effected by a single dose of 1 c.c. alum precipitated toxoid is not of sufficient permanency to justify the continued use of a single dose as the method of choice in diphtheria control.

Attention is directed to information gained from this study, which indicates that a somewhat more permanent protection is secured in those children receiving the second dose of 1 c.c. alum precipitated toxoid. It will be noted that this group showed that 60 per cent retained immunity compared with 42.2 per cent retained by the group having only 1 dose. However, this small group consisted of children who were never Schick negative, as far as this study is concerned, and may include children who are recognized to be resistant to any antigen.

TABULATION OF GROUP C

This comprises a final group of 549 children who were initially Schick positive, given 1 dose of 1 c.c. alum precipitated toxoid, retested on the 28th or 60th day and found to be Schick negative, and retested 2 years later December 4–6, 1935.

The group receiving the second dose of 1 c.c. alum precipitated toxoid 60 days after the first dose is quite small. However, it confirms the theory that

TABLE I

School	Total Group Available from Original Study	No. Neg. 1933	No. Retested Dec., 1935 Results: Neg.	No. Retested Dec., 1935 Results: Pos.	No. Receiving 2nd Dose A.P. Toxoid, 1933 and Results of Retest, Dec. 4–6, 1935: No.	Neg.	Pos.
A	23	16	8	8	7	4	3
B	27	25	5	20	2	1	1
C	45	36	4	32	9	3	6
D	50	44	16	28	6	3	3
E	32	23	13	10	9	9	0
F	16	14	4	10	2	2	0
G	45	37	15	22	8	6	2
H	49	40	4	36	9	2	7
I	32	30	9	21	2	0	2
J	16	10	3	7	6	1	5
K	41	35	18	17	6	3	3
L	65	63	32	31	2	2	0
M	47	43	22	21	4	3	1
N	30	28	20	8	2	1	1
O	136	105	59	46	31	22	9
Total	654	549	232	317	105	62	43
Percentage			42.2	57.8		60	40

secondary stimulus is required to produce sufficient antitoxin in the blood stream to effect more lasting immunity. If this be true, as we believe, multiple doses of alum precipitate or unmodified toxoid are indicated. This study was undertaken primarily for the purpose of determining the degree and permanency of the immunity from a single dose of alum precipitated toxoid. Our findings confirm in this respect the report of Fraser and Halpern, University of Toronto, Canada,[2] who show by blood serum titrations in a group of children, that the antitoxin response "to 3 doses of unmodified toxoid is distinctly better than the response to 1 dose of alum precipitated toxoid." These titrations were made before injection and 10 weeks, and 1 year after injection, with the following results:

	Units Antitoxin 10 Weeks	*Units Antitoxin 1 Year*
1 dose A. P. toxoid	62% more than 1/100	19% more than 1/100
	30% more that 1/50	11% more than 1/50
3 doses plain toxoid	91% more than 1/100	91% more than 1/100
	91% more than 1/50	69% more than 1/50

SUMMARY AND CONCLUSIONS

1. Analysis of the data from the initial study of Groups A and B indicates early and high immunity from 1 dose of 1 c.c. alum precipitated toxoid on the 28th and 60th day after inoculation, as determined by Schick test.

2. Analysis of the data of Group C comprising a group of 549 children who were Schick negative 60 days after administration of 1 dose of alum precipitated toxoid, indicates that 57.8 per cent have lost this protection at the end of 2 years.

3. The group of children receiving a second dose of alum precipitated toxoid indicates somewhat higher percentage of immunity at the end of the 2 years. It is recognized that this group was extremely small. However, 60 per cent were Schick negative compared with 42.2 per cent for the group receiving a single dose.

4. The benefit derived from secondary stimulus by means of multiple injections of antigen is indicated.

5. These data confirm the belief that efforts to simplify the technic to a single dose antigen led to the sacrifice of reasonable permanency of immunity for greater convenience of administration.

6. From this study we hope to stimulate further laboratory and clinical research in order to determine on a plan of more permanent protection against diphtheria.

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2. Fraser, D. T., and Halpern, K. C. Diphtheria Toxoid—A Comparison of One Dose of Alum Precipitated with Three Doses of Unmodified Toxoid. *Canad. Pub. Health J.*, XXVI, 10 (Oct.), 1935.

Government Lands

AT a recent meeting of the American Title Association, Memphis, it was reported that the government now owns more than 400,000,000 acres of land. In the last fiscal year public domain increased 2,850,000 acres. For the present fiscal year acquisition of more than 10,000,000 acres is planned.

Response to Rabies Vaccine Prophylaxis as Shown by Protection Tests*

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TWO years ago we reported on Rabies Vaccine Protection Tests [1] and detailed the intralingual method of the injection of the infective dose of rabies virus into rabbits and the advantages of the method and test.

We have continued with the test on rabbits on the basis that rabies vaccine prophylaxis should actually protect the animal against an infective dose of rabies virus, which in the amount of 0.1 c.c. of a 5 per cent fresh brain tissue emulsion from a rabbit dead of fixed rabies virus, injected intralingually or directly into the tongue, should prove fatal for at least two-thirds of the control rabbits. Such injections usually result in a fatal infection in more than two-thirds of the control rabbits and not infrequently in all of the controls with a period of incubation and death in 8 to 9 days as against 6 to 7 days when the same dose of fixed rabies virus is injected intracranially.

The group 1 rabbits died in 9 days, and all of the group 5 rabbits survived the initial infective dose. The death of 1 rabbit of the 6 in group 4 not only indicates the infectivity of the 0.0001 c.c. dose, but also the effect on the period of incubation and death, which in this instance was lengthened to 16 days. The 0.01 c.c. dose proved infective for 5 of the 6 group 2 rabbits, and 2 of these showed a lengthening of the period of incubation and death to 10 days. Group 3 rabbits with the 0.001 c.c. infective dose showed an increased period of incubation and death of 10–14 days in the 4 of the 6 rabbits in which the dose proved fatal.

The rabbits that survived the original infective dose were held for 24 days and then injected intralingually with a 0.1 c.c. dose of a 5 per cent brain tissue suspension of fixed rabies virus, identical with the dose originally employed on the group 1 rabbits of which there were no survivals. The second infective dose injections had no apparent effect on the 1 surviving rabbit of group 2, and the 2 rabbits of group 3, which may indicate natural resistance to all of the injections of these rabbits or increased resistance from the first injection which enabled these rabbits to withstand the second infective dose. The group 4 rabbits are of special interest in that at least sufficient rabies virus was included in the 0.0001 c.c. dose to infect 1 of the 6. The remaining 5 rabbits on the second infective dose showed natural susceptibility in 3, with death in 8 to 9 days, while 2 survived. The second infective dose on the group 5 rabbits killed 5, or over two-thirds, which is the usual occurrence in control groups of rabbits. The results

* Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 8, 1935.

TABLE I

SHOWING THE RELATIONSHIP OF THE SIZE OF THE INFECTIVE DOSE, INJECTED INTRALINGUALLY TO THE PERIOD OF INCUBATION AND DEATH

Group	Rabbits	Infective Dose 12-17-34	Brain Tissue 5% Suspension	Results†	Interval	Infective Dose 5% Brain Tissue 1-17-35	Rabbits	Results†
1	6	0.1 c.c. Intralingually	0.1c.c.	6—Dead— 9 days—100%	24 days	0.1 c.c. Intralingually	..	....
2	6		0.01*	2—Dead— 8 days 1—Dead— 9 days— 84% 2—Dead—10 days	24 days		1	Living—100%
3	6		0 001*	2—Dead—10 days 1—Dead—13 days— 66% 1—Dead—14 days	24 days		2	Living—100%
4	6		0.0001*	1—Dead—16 days— 16%	24 days		5	2—Dead—8 days 1—Dead—9 days—60%
5	6		0.00001*	Living—100%	....		6	4—Dead— 8 days 1—Dead—11 days—83%

* Represents dilution of the original 5% suspension to permit injection of 0.1 c.c. doses
† Deaths preceded by definite symptoms of rabies

TABLE II

RABIES VACCINE PROTECTION TESTS ON RABBI S

Group	Rabbits	Rabies Vaccine Phenol Killed*	Infective Dose† Interval	Results‡	Control Rabbits†	Results‡	Control Rabbits§	Results‡
1	2	0.5 c.c. 7 days	1 day	Living 50%	3	Dead 100%	3	Dead 100%
2	3	0.5 c.c. 7 days	3 days	Living 100%	3	Dead 100%	3	Dead 100%
3	3	0.5 c.c. 7 days	5 days	Living 66%	3	Dead 66%	3	Dead 100%
4	3	0.5 c.c. 7 days	7 days	Living 66%	3	Dead 66%	3	Dead 100%
5	3	0.5 c.c. 7 days	10 days	Living 100%	3	Dead 33%	3	Dead 100%
6	3	0.5 c.c. 7 days	14 days	Living 100%	3	Dead 66%	3	Dead 66%
7	3	0.5 c.c. 7 days	21 days	Living 100%	3	Dead 100%	3	Dead 100%

* 25% Brain tissue emulsion rabies vaccine, daily subcutaneous injections
† 0.5% Brain tissue emulsion rabies virus, 0.1 c.c. injected intralingually
‡ Deaths preceded by definite symptoms of rabies
§ 0.5% Brain tissue emulsion rabies virus, 0.1 c.c. injected intracranially

TABLE III

RABIES VACCINE PROTECTION TESTS ON RABBITS

Group	Rabbits	Normal Rabbit Brain and Cord Tissue*	Infective Dose† Interval	Results‡	Control Rabbits†	Results‡	Control Rabbits§	Results‡
1	2	0.5 c.c. 7 days	1 day	Dead 100%	3	Dead 100%	3	Dead 100%
2	3	0.5 c.c. 7 days	3 days	Dead 66%	3	Dead 100%	3	Dead 100%
3	3	0.5 c.c. 7 days	5 days	Dead 66%	3	Dead 66%	3	Dead 100%
4	3	0.5 c.c. 7 days	7 days	Dead 100%	3	Dead 66%	3	Dead 100%
5	3	0.5 c.c. 7 days	10 days	Dead 66%	3	Dead 33%	3	Dead 100%
6	3	0.5 c.c. 7 days	14 days	Dead 100%	3	Dead 66%	3	Dead 66%
7	3	0.5 c.c. 7 days	21 days	Dead 100%	3	Dead 100%	3	Dead 100%

* 25% Normal rabbit brain and cord tissue phenolized emulsion, daily subcutaneous injections
† 0.5% Brain tissue emulsion rabies virus, 0.1 c.c. injected intralingually
‡ Deaths preceded by definite symptoms of rabies
§ 0.5% Brain tissue emulsion rabies virus, 0.1 c.c. injected intracranially

of the Table I data support the deduction that the simultaneous use of dilutions of fixed rabies virus, injected intralingually is accompanied by a lengthening of the period of incubation.

The groups 1 to 7 rabbits all received the same rabies vaccine phenol killed in 0.5 c.c. daily doses for 7 days, injected subcutaneously. The infective dose for each group was injected intralingually with a time interval of 1 day for group 1 to 21 days for group 7. The results indicate that as short an interval as 3 days is followed by an increased resistance. Of the 20 rabbits injected with daily 0.5 c.c. doses of rabies vaccine phenol killed, 17 survived the infective dose, and 3 died irrespective of the different intervals, while of the 21 control rabbits injected intralingually with the infective dose only 5 survived and 16 died, and of the 21 control rabbits injected intracranially with the infective dose 1 survived and 20 died.

Groups 1 to 7 rabbits were injected subcutaneously with 25 per cent *normal* rabbit brain and cord tissue phenolized emulsion in 0.5 c.c. daily doses, so that the results could be compared with the results of the protection tests of Table II. Of the 20 rabbits included in groups 1 to 7 in Table III, only 3 survived, and 17 died following the intralingual injection of the infective dose, showing that *normal* rabbit brain and cord tissue emulsion did not increase the resistance of the rabbits, and that the rabbits were as susceptible as the control rabbits, of which 21 injected intralingually 5 survived and 16 died, while of the 21 control rabbits injected intracranially 1 survived and 20 died.

Groups 1 to 10 rabbits were injected subcutaneously with 0.5 c.c. doses of rabies vaccine phenol killed and group 1 to 7 injected intralingually with the infective dose without an interval between the last dose of vaccine and infective dose. None of the rabbits developed an increased resistance. Groups 8, 9 and 10 injected with 7 daily doses of vaccine followed by an interval of 1, 2 and 3 days, had an increased resistance to the infective dose. Of the 30 control rabbits injected intralingually with the infective

TABLE IV

RABIES VACCINE PROTECTION TESTS ON RABBITS

Group	Rabbits	Rabies Vaccine Phenol Killed*	Infective Dose† Interval	Results‡	Control Rabbits†	Results‡	Control Rabbits§	Results‡
1	3	0.5 c.c. 1 day	......	Dead 66%	3	Dead 100%	3	Dead 100%
2	3	0.5 c.c. 2 days	......	Dead 66%	3	Dead 100%	3	Dead 66%
3	3	0.5 c.c. 3 days	......	Dead 100%	3	Dead 66%	3	Dead 100%
4	3	0.5 c.c. 4 days	......	Dead 66%	3	Dead 100%	3	Dead 66%
5	3	0.5 c.c. 5 days	......	Dead 66%	3	Dead 66%	3	Dead 100%
6	3	0.5 c.c. 6 days	......	Dead 100%	3	Dead 100%	3	Dead 100%
7	3	0.5 c.c. 7 days	......	Dead 66%	3	Dead 66%	3	Dead 100%
8	3	0.5 c.c. 7 days	1 day	Living 66%	3	Dead 66%	3	Dead 100%
9	3	0.5 c.c. 7 days	2 days	Living 100%	3	Dead 66%	3	Dead 100%
10	3	0.5 c.c. 7 days	3 days	Living 100%	3	Dead 66%	3	Dead 100%

* 25% Brain tissue emulsion rabies vaccine, daily subcutaneous injections
† 0.5% Brain tissue emulsion rabies virus, 0.1 c.c. injected intralingually
‡ Deaths preceded by definite symptoms of rabies
§ 0.5% Brain tissue emulsion rabies virus, 0.1 c.c. injected intracranially

TABLE V

RABIES VACCINE PROTECTION TEST ON RABBITS

Group	*Rabbits*	*Rabies Vaccine Phenol Killed* *	*Infective Dose* † *Interval*	*Results* ‡
1	3	1.25 c.c.	14 days	Dead 66%
2	3	2.5 c.c.	"	Dead 100%
3	3	3.75 c.c.	"	Living 66%
4	3	5.0 c.c.	"	Living 100%
5	3	6.25 c.c.	"	Living 66%
6	3	Intralingual Controls		Dead 66%
7	3	Intracranial Controls		Dead 100%

* 20% Brain tissue emulsion rabies vaccine (horse), subcutaneously injected
† 0.5% Brain tissue emulsion rabies virus, 0.1 c.c. injected intralingually
‡ Deaths preceded by definite symptoms of rabies

dose of fixed rabies virus, 6 survived and 24 died, and of the 30 control rabbits injected intracranially 2 survived and 28 died.

Groups 1 to 5 rabbits were injected subcutaneously with a single dose of rabies vaccine, phenol killed, and after an interval of 14 days each rabbit was injected intralingually with the infective dose.

Inasmuch as 2 of the 3 group 1 rabbits injected with 1.25 c.c. single dose of vaccine died and all 3 of the group 2 rabbits injected with 2.5 c.c. single dose of vaccine died, the doses of vaccine injected failed to increase the resistance of the rabbits to the infective dose. The single doses of vaccine injected into groups 3, 4, and 5 rabbits apparently increased the resistance of these rabbits to the infective dose. The death of 1 rabbit in groups 3 and 5 suggests that the 3.75 c.c. dose of group 3 and the 6.25 c.c. dose of group 5 were less efficient than the 5 c.c. dose of group 4.

The data in Table V show that sufficient vaccine must be included in the single dose to show increased resistance to the infective dose after a 14 day interval. There is also some indication that there are limits to the proper dose and that too much vaccine may not increase the resistance of rabbits to the infective dose after a 14 day interval any more than too little vaccine in the single dose.

CONCLUSIONS

Fresh fixed rabies virus in the form of a 5 per cent brain tissue suspension in 0.1 c.c. doses injected intralingually can be relied upon as an infective dose, and to produce rabies in rabbits with an incubation period and death in from 8 to 9 days. It has been shown that dilutions of the virus so injected, are accompanied by an increase in the period of incubation, and that it is possible to inject a dilution which is capable of infecting only a small percentage of the rabbits, and the rabbits that do develop rabies in the higher dilutions will have a lengthened period of incubation.

In the protection tests described, phenol killed rabies vaccine was administered under various dosage schemes and intervals before the injection of the infective dose. These tests show that it is possible to increase the resistance of rabbits injected with rabies vaccine phenol killed, and then exposed to the infective dose, while rabbits prophylactically treated with normal rabbit brain tissue emulsion show no increased resistance to the infective dose of fixed rabies virus.

It seems necessary to employ the proper amount of rabies vaccine in the single dose prophylactic treatment to increase the resistance of rabbits to an infective dose after a 14 day interval.

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Incidence and Behavior of Non-Lactose Fermenting Bacteria from Normal Stools

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IN 1934 the author[1] described a number of strains of Gram-negative, non-lactose fermenting bacteria isolated from the stools of 25 out of a group of 127 healthy food handlers, during a routine search for intestinal pathogens. Six additional groups, totaling 384 food handlers, have now been examined, and similar bacteria, resembling the Salmonella but failing in one respect or another to fit in that group, have been isolated from 84 stools. This paper presents data on the incidence of these organisms, evidence through lactose fermentation of their relationship to the colon group, a description of the dissociation of colon strains into non-lactose fermenting variants, and a report of the quantitative utilization of lactose by the non-lactose fermenting bacteria.

The procedure followed in isolating the cultures has already been described[1]: first platings from stools on eosin-methylene-blue agar and transfer of colorless colonies to Russell's double sugar agar slants. All cultures were tested for fermentation of carbohydrates, the production of indol, the Voges-Proskauer and methyl-red reactions, the utilization of citrate as sole source of carbon, the liquefaction of gelatin, and agglutination in specific diagnostic sera.

INCIDENCE

Table I lists the number of food handlers examined in each group and the number of non-lactose fermenting strains isolated. Two facts are evident from this table: (1) Non-lactose fermenting bacteria were encountered

TABLE I

INCIDENCE OF NON-LACTOSE FERMENTING BACTERIA IN NORMAL STOOLS

Group	*Year Isolated*	*No. Persons Examined*	*No. Non-lactose Fermenting Strains*	*Per Cent Persons Harboring Non-lactose Fermenters*	*Month Isolated*
A-2	1933	120	33	27.5	Early Oct.
B	1934	40	12	30	Oct.
A-3	1934	47	11	23	Nov.
A-1	1932	127	25	19.6	Nov.
			Previously reported		
C	1934	41	9	22	Dec.
A-4	1935	67	9	13.5	Dec.
D	1936	69	10	14.5	Jan.

every year and in each group of food handlers, although no carriers of intestinal pathogens were found. (2) The incidence of these strains generally decreases through the winter months, the incidence being highest in October and decreasing through December and January. This fact was demonstrated indirectly in an earlier report [1] which described the examination of 21 food handlers whose stools all had contained these organisms in November; when recultured in March only 3 stools contained them. The data suggest a seasonal variation with highest incidence in the late summer months. The institutions employing these food handlers are closed during the summer and an examination of the subjects is impossible until fall.

There was also a variation in individuals from year to year, shown when the stools of 102 food handlers (in Groups A-1 and A-2, Table I) were cultured in 2 successive years. It was found that these bacteria were neither constantly present nor culturally identical in any individual. The stools of 19 subjects contained these bacteria in 1933, though they had been negative the year before; the stools of 13 were negative in 1933 though they had been positive the year before; the stools of only 8 contained these organisms both years, and they were not biologically identical. Eighty stools were negative both years.

In a study of Lactose Degraded Colon-Aerogenes Organisms in Normal Feces, Parr [2] found that such organisms were rare in fresh feces, but increased to about 17 per cent in stored feces. He later demonstrated [3] that this increase was caused by a change in ordinarily normal colon organisms. Confirmation of the fact that such changes can occur in colon bacteria will be given later, but aging or storage of the specimens does not account for the high percentage of the strains described here. Great care was taken in timing the collection of specimen tubes so that the stools could be plated within a very short time after passage. No specimens were shipped nor were preservatives used.

LACTOSE FERMENTATION

Following the method outlined in an earlier paper,[1] all the original non-lactose fermenting cultures were incubated in 5 per cent lactose-peptone-water with Andrade indicator, for 2 weeks. Those cultures which produced any fermentation were transferred to 1 per cent lactose, in series, until fermentation occurred daily. These cultures were then plated on eosin-methylene-blue agar, and their ability to use lactose in a solid medium was noted. Table II, using the same groups as Table I, shows that an average of 55 per cent of the originally non-lactose fermenting strains finally fermented lactose, and that an average of 56 per cent of these acquired a completely colon type of reaction on eosin-methylene-blue agar. Once acquired, the ability to ferment lactose has been permanent. The cultures really fall into two groups, the "slow lactose fermenters," which give a delayed reaction and half of which assume all the characters of true colon bacteria,* and the true "non-lactose fermenters," which never ferment this sugar. The colonies of the slow lactose fermenters, in pure culture on eosin-methylene-blue agar, are large, opaque, and faintly colored, in contrast to the colonies of the non-lactose fermenters which are small, gray and transparent.

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* The term "true colon bacteria" is used here in a broad sense to include aerobic, Gram-negative, nonspore forming bacilli, fermenting lactose with acid and gas in the standard liquid and solid differential media, and producing the characteristic color and metallic sheen on eosin-methylene-blue agar.

TABLE II

LACTOSE FERMENTATION

Group	*Total No. of Strains*	*No. Finally Fermenting 5 Per Cent Lactose*	*Typical Coli on E.M.B. Agar*
A-1	25	17	12
		Previously reported	
A-2	33	14	5
A-3	11	9	4
B	12	7	3
C	9	4	4
A-4	9	5	3
D	10	4	3

DISSOCIATION OF COLON CULTURES INTO NON-LACTOSE FERMENTERS

A striking example of the loss of power to attack lactose was furnished by a number of strains of *Escherichia coli*. A large group of strains (120) of true colon bacteria * had been isolated from the stools of the food handlers in Group A-2, and were stored on extract slants. Several months after isolation, these cultures were again plated on eosin-methylene-blue agar. Colorless colonies were observed in 19 of the cultures. Although the colon cultures were purified twice, the non-lactose fermenting colonies invariably appeared after the cultures had aged 2 or more weeks on the slants. Single cell isolations of 13 of the dissociating cultures were then made by fishing from dilute suspensions on agar with the aid of a micromanipulator. These single cell cultures had true colon reactions when first isolated, but non-lactose fermenting colonies appeared in all of them when they had aged on the slants for a few weeks. Except for the reaction to lactose, all the variants were identical with the parent strains. When grown in .5 per cent lactose, one of the variants fermented it weakly, but the rest were true non-lactose fermenters, and this character has been permanent. Since the variants arose unquestionably from unmixed colon strains, strong support is furnished for the view that such strains appearing in normal stools can also be variants of true colon bacteria.

An attempt was made to produce this change in colon bacteria by a controlled experiment. Fifteen colon cultures were grown for 4 months at room temperature in 3 different media: a saline suspension of sterile feces, 10 per cent ox bile, and extract broth. No variants appeared in any of the cultures. It is evident that neither feces nor pure bile had a retarding influence, in the test tube at least, on the ability of these cultures to ferment lactose. Five of the strains were originally slow lactose fermenters, which had acquired a completely colon type of reaction. The remainder of the cultures were 3 Aerobacter, 1 Citrobacter, and 6 Escherichia.

The effect of a strong colon bacteriophage,* acting for several weeks on a group of colon strains, was also studied. Rough colonies appeared among the resistant forms which grew out after lysis, but no change was observed in regard to lactose fermentation. The fact that colon variants may show colony differences but no alteration in the fermentation of sugars has also been observed by Bergstrand,[4] Lewis,[5] Gratia,[6, 7] and others. In a control group of cultures which were not attacked by this phage, a few strains produced non-lactose fermenting colonies after several weeks. However, these appeared also in the broth tubes containing no phage, and are therefore clearly not the result of bacteriophage action, but are simply another example

* The term "true colon bacteria" is used here in a broad sense to include aerobic, Gram-negative, nonspore forming bacilli, fermenting lactose with acid and gas in the standard liquid and solid differential media, and producing the characteristic color and metallic sheen on eosin-methylene-blue agar.

* I am indebted to Dr. Roy Feemster for the use of all the bacteriophages employed in the tests described here.

of the susceptibility of certain cultures to the effects of aging.

The dissociation of these colon strains into non-lactose fermenting bacteria has remained an unexplained phenomenon, and no light has been thrown on the nature of the change by our attempts to produce similar effects through the action of feces, bile, or bacteriophage. Parr[3] observed that this type of change is more easily effected by these methods in the Aerobacter group than in the Escherichia group. All the variants reported here however, arose from the Escherichia type.

UTILIZATION OF LACTOSE

Jones, Orcutt, and Little[8] have described a group of non-lactose fermenting bacteria which they isolated from the feces of cows with infectious diarrhea. Continuous incubation in lactose broth resulted in fermentation in varying periods of time. When they determined quantitatively the amount of lactose consumed by 5 of these cultures, they found that the sugar was utilized from the beginning in as large amounts as colon strains used, but that the pH was high and this alkalinity was masking the fermentation for some days.

To see if a similar condition was true of the organisms reported here, a group of slow lactose fermenters and non-lactose fermenters was selected and grown in 1 per cent lactose-peptone-water. Neither salt nor indicator was added, and the medium was sterilized by filtration through a Berkfeld N filter to avoid any hydrolysis of the sugar in autoclaving. The lactose consumed was determined by the method adapted for bacterial cultures by Stiles, Peterson, and Fred[9] from Shaffer and Hartmann's[10] volumetric method. Analyses were made after 2 and 6 days' growth at 38° C., that is, before and after fermentation was expected. Before each analysis, Andrade indicator was added to a portion of the culture to demonstrate the usual acid reaction, if present. The exact pH was also determined colorimetrically. Considerable difficulty was experienced with the method, and the error was large; averages of the results were nevertheless consistent. Ten strains of slow lactose fermenters consumed as much lactose as 4 colon strains (0.3–0.6 mg.), but not until the customary acid production was evident with Andrade indicator, and not until the pH had fallen to 5.0 or lower. Seven strains of non-lactose fermenters and 2 strains of *Salmonella paratyphosus* B consumed no lactose, or very small amounts which could be attributed to error in analysis (—0.052 to +0.053 mg.). They also showed no change in pH and remained colorless when Andrade indicator was added. In short, the result of these determinations showed that the utilization of lactose by these cultures was accurately shown by the usual fermentation tests.

CLASSIFICATION

The cultures described here consisted of morphologically short, Gram-negative bacteria, almost coccoid in form in contrast to the longer bacillary form of the usual colon bacteria. They all produced gas in the carbohydrates fermented. All fermented some sugars in addition to dextrose, so were not Morgan's bacillus. None liquefied gelatin in 2 weeks' growth. None of the colonies developed lactose fermenting papillae in several days' growth on plates; so they could not be considered as *B. coli mutabile*, described by Neisser[11] and recently by Dulaney and Michelson.[12]

Attempts to classify these non-lactose fermenting and slow lactose fermenting strains by agglutination in specific diagnostic sera were futile. Antisera (Mul-

ford's) for 2 Escherichia types, 4 Salmonella, 3 Dysenteriae and *E. typhosus* were used diluted and undiluted against suspensions of all the organisms. Over 65 per cent of the strains were entirely negative, and the positive ones agglutinated nonspecifically in the entire range of sera, and in low dilutions only. A group of 15 strains of colon bacteria reacted in exactly the same way.

Further attempts to classify these strains by the action upon them of a large number of coli, dysentery, and typhoid bacteriophages also failed. Very few of the strains were susceptible to lysis. Those which were attacked by the phages were not affected specifically.

The cultural reactions of these bacteria, however, place them surely in the colon group. The 60 strains of slow lactose fermenters may thus be considered as colon bacteria. Of the 49 strains of non-lactose fermenters, 26 fermented sucrose, or formed indol or did both, and may also be grouped with the colon bacteria, on this basis. The remaining 23 strains of non-lactose fermenting bacteria did not form indol or ferment sucrose, but may also be classed with the colon group for this reason: 8 strains of indol negative sucrose negative *Escherichia coli* were isolated, and 2 of these strains produced non-lactose fermenting variants identical with them except for the lactose reaction, as already described. Therefore it is obvious that cultures identical with the Salmonella in all respects except agglutination, can arise from true colon strains.

If then these cultures are all regarded as members of the colon group, it is possible to classify them in established groupings by the Voges-Proskauer and methyl-red reactions, indol production and citrate utilization. Following the groupings of Werkman and Gillen,[13] Levine,[14] and Kline,[15] these 109 cultures can be grouped as 74 strains of Escherichia, 14 strains of Citrobacter, and 21 strains of Aerobacter. Eleven of these were the "intermediate" types described by Kline,[15] Tittsler and Sandholzer,[16] Koser,[17] and others. That is, they varied from the type in the Voges-Proskauer or methyl-red reaction, or in indol production or utilization of citrate. All the strains in the Escherichia group could be classified on the basis of sucrose and salicin fermentation by the simplified method of Levine [14] into the 4 common varieties.

CONCLUSION

Although the organisms reported here were isolated from healthy people, it must be remembered that most of this type of organism described in the literature have been isolated from cases of diarrhea, sometimes in epidemic form. The accumulation of evidence showing the presence of these bacteria during intestinal derangements cannot be disregarded simply by classifying them in the colon group. It is significant that the fermentation of lactose, which has provided the chief routine distinction between the pathogenic and non-pathogenic intestinal forms, should be the reaction most subject to fluctuation. The frequency with which these lactose aberrant colon bacteria are encountered in intestinal disturbances suggests that the loss of power to ferment lactose may be related to a possible transition state between the non-pathogenic colon group and the pathogenic Salmonella.

SUMMARY

1. Non-lactose fermenting bacteria have been isolated from stools of 109 healthy people in routine stool examinations of 511 food handlers of several schools.

2. These strains were encountered in each group examined.

3. A seasonal variation was observed, with highest incidence near the summer months, and decreasing through the winter.

4. Repeated examinations showed that these organisms were not constantly present in any individual, nor did constant types occur in one person.

5. Over half of the organisms were finally able to ferment lactose, and over half of these acquired a completely colon type of fermentation on solid media.

6. Dissociation of 19 strains of *Escherichia coli*, 13 strains of which were single cell cultures, into permanently non-lactose fermenting variants, is described.

7. Neither the action of a strong coli bacteriophage, nor growth in sterile feces and in 10 per cent bile, produced non-lactose fermenting colonies in colon strains.

8. Quantitative determinations of the amount of lactose consumed by a group of these cultures showed that lactose was not utilized until acid production was apparent by the usual tests.

9. Classification of the cultures by agglutination in diagnostic sera, and by the action of bacteriophage, was impossible.

10. However, classification by cultural reactions was possible, and all the strains were shown to belong to one type or another in the colon group.

11. Although it is a simple matter to classify these organisms in the colon group by careful attention to all the aspects of lactose fermentation, it is suggested that the frequent reports of their presence in intestinal disturbances may indicate a transition state between the non-pathogenic and the pathogenic types.

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Improvised Clinic

WITH the nearest hospital 30 miles away, the little community on Grand Isle in Lake Champlain needed a medical center desperately. So Dr. and Mrs. Frank Hall decided in 1933 to convert an unoccupied house into a clinic.

Substituting energy for capital, they rescued old "double-deckers" which a nearby camp was discarding and converted them into hospital beds. They contrived bedding from anything that could be sewn together and made pillows from discarded pieces of oilcloth. The operating table was built by the local carpenter for one dollar. Out of the kitchen came Mrs. Hall's roaster, promoted to the rank of sterilizer. The community helped. Local women became nurses; others made bandages.

Patients pay for services according to their means, sometimes in cash (as little as 50 cents for an operation), sometimes in produce. One man is paying for his baby in perch at 15 cents a dozen.—*Readers Digest*, February, 1936, p. 109.

Incidence and Significance of Beta Hemolytic Streptococci in Cultures from a Selected Group of Milk Handlers*

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THE subject of laboratory examinations of milk handlers as an integral part of a program for the control of milk-borne disease has been reviewed by West, Borman, and Mickle [1] and Borman, West and Mickle.[2] In the publication of the former the results of experience in Connecticut with a state-wide program of this type were discussed. This paper prompted the formulation of a questionnaire regarding the value of the Connecticut program and of all such examinations in general, which was submitted to persons considered qualified to express authoritative opinions. The replies to this questionnaire formed the basis for a general discussion of the subject presented in the latter paper. One point in particular was so obviously controversial that no satsifactory conclusion could be drawn from the many opinions expressed; *i.e.*, the value of examinations of throat and nose cultures for beta hemolytic streptococci.

Prompted by the paramount importance of streptococcus infections in the history of milk-borne disease, Borman, West, and Mickle [2] made the following recommendation in formulating a rational milk-handler control program:

> Examinations of throat and nose cultures for beta hemolytic streptococci should be incorporated as soon as reliable and practicable methods for determining the virulence or invasive power of any given strain are developed. In the absence of a satisfactory criterion it may be desirable in some areas to regard any milk handler as dangerous when he is harboring large numbers of typical beta hemolytic streptococci.

The necessity for examining this recommendation in the light of a controlled experiment to determine its feasibility was apparent. The study now to be presented and discussed was designed to throw light on the following points: (1) the efficiency of routine methods, practicable in a centrally located public health laboratory, for detecting the presence of beta hemolytic streptococci in throat and nose cultures; (2) the incidence of positive cultures in a representative group of milk handlers under normal conditions; (3) the extent of association of positive cultures with significant clinical find-

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* Based in part on a dissertation submitted by the senior author, while a Commonwealth Fund Fellow, to the Faculty of Yale University in partial fulfillment of the requirements for the degree of Doctor of Public Health. Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

ings; (4) the characteristics and probable significance of the strains isolated.

PLAN OF THE STUDY

Permission was secured from the managers of 5 dairies to take weekly throat and nose cultures of their 85 employees. The dairies were selected to include distributors both of raw and of pasteurized milk. Although it was realized that cultures taken more frequently would probably throw more light on the intermittency of the carrier state, practical considerations made more frequent culturings not only inadvisable—lest the coöperation of the subjects be lost—but physically impossible, since the time spent by the physician doing the field work in addition to a portion of the laboratory work was limited by other duties. Weekly cultures, however, were considered much more satisfactory from this standpoint than the monthly, semi-annual, or annual cultures required in Connecticut for handlers of certified, Grade A raw and pasteurized milk respectively. The number of men cultured each week varied somewhat since a few men would necessarily be taking their "day off" on the day of each visit. Nine of the 85 subjects could be cultured only 3 times or less. No attempt was made to explore the tonsillar crypts since we wished to simulate conditions under which routine cultures are taken by physicians examining milk handlers in Connecticut.

Symptoms of acute rhinitis, tonsillitis, and pharyngitis or other significant clinical findings were noted when the swabs were taken.

In order to determine the effect of drying and other factors associated with delay, duplicate swabbings were made of both the throat and the nose of each man cultured. One swab was used for making "immediate" cultures by the senior author; the other was sent by parcel post to the Bureau of Laboratories in Hartford simulating conditions under which milk handler cultures had been handled since the inception of the Connecticut program described in the publication[1] previously cited. All "immediate" cultures were made not later than 1½ hours after obtaining the swabbings; the majority within 1 hour. The swabs sent through the mails were cultured about 18 hours after collection. The first swabbings obtained were used for "immediate" culturing one week, and for "delayed" culturing the following week. This was carried out serially throughout the study.

"Immediate" plate cultures were made by surface inoculation on both sheep blood agar and on neopeptone-Savita rabbit blood agar.* The order of streaking plates was alternated each week; *i.e.,* sheep blood agar first one week, rabbit blood agar first the following week, and so on in rotation. One-half of each plate was used for streaking the throat specimen, the other half for the nose specimen, from one individual. The surface method of inoculation was chosen because of difficulties which make the use of pour plates impracticable in a central laboratory where specimens arrive for plating at any time of the day or night. Furthermore, since further studies of the strains isolated were planned, detailed observation of sub-surface colonies was not felt necessary.

During the first 3 weeks of the study swabbings for "delayed" culture were inoculated onto moist Loeffler's blood serum slants in the field, and both slants and swabs were then sent through the mails. The slants were subsequently sub-cultured on sheep blood agar for beta hemolytic streptococci. "Delayed" cultures from the swabs were made only on the sheep blood agar in a manner identical with

* The cost of materials for this medium was defrayed by a grant from the Research Fund of the School of Medicine of Yale University.

that employed in making "immediate" cultures. In addition, during 3 weeks of the study the swabs were cultured in dextrose broth with subsequent plating on sheep blood agar.

Only cultures showing colonies or areas surrounded by a clear zone of beta type hemolysis caused by streptococci were considered positive. All positive cultures were studied after isolation in pure culture for morphological, biochemical and serological characteristics. Each strain was tested for final pH in dextrose broth,[3] hydrolysis of sodium hippurate,[4] effect upon methylene blue milk,[5] and fermentation of sorbitol and trehalose.[6] An extract containing the group-specific precipitinogen was prepared from each strain and tested against antisera for the serological groups A, B, C, and D of Lancefield.[7]

Strains obtained directly from Dr. Lancefield were used for the preparation of antisera. The technic of injecting rabbits was as follows: The group A antigen was prepared fresh daily by centrifugalizing a heat-killed broth culture of the strain representative of the group. The other group antigens were prepared by sedimenting broth cultures of the strains used and formolizing the sediment. Antisera were prepared by daily intravenous injections into rabbits over a period of 10–12 days. On the first day, 0.3 ml. of the sediment from 10 ml. of broth culture was injected. The dosage was gradually increased to 2.5 ml. of the sediment from 150 ml. of the respective broth cultures for the last injection. Sera of high precipitin titer could be prepared in 15 days by the use of this method. All sera prepared were checked for specificity. Reciprocal cross-reactions were obtained with the groups A and C antisera when tested against extracts of the strains used for antiserum preparation.

Extracts containing precipitinogens were prepared according to the technic described by Lancefield.[7] In making the precipitin tests, the respective antisera were layered under the extracts in Hektoen tubes by means of capillary pipettes. Readings were made after 2 hours at room temperature by observing ring formation in the zone between the layers. The contents of the tubes were then mixed and allowed to stand over night in the refrigerator before the final reading was made by observing precipitation in the bottoms of the tubes.

One observation * in connection with the fermentation tests is worthy of note here. Much more rapid and satisfactory results were obtained when the carbohydrates were incorporated in a nutrient broth base containing 0.05 per cent agar than when Hiss's serum water (prepared from human serum) was used. Fermentation of trehalose was often obtained in the former medium within 24 or 48 hours which occurred only after as long as eight or ten days, or not at all in the latter medium. The explanation for this probably involves the occurrence of a zone of the proper oxidation-reduction balance surrounding the particles of agar in colloidal suspension. Certainly it could not in this case be construed as due to the presence of a growth promoting nutritional factor in the broth containing agar. In every instance growth and acid production were first observed about 5–6 mm. below the surface where settling of the agar particles produced a shelf. The organisms appeared to grow at the interfaces formed by the particles and the broth in which they were suspended.

RESULTS OBTAINED

During the 13 week period of the study, 756 throat and 756 nose speci-

* We are indebted to Professor Charles A. Stuart, Department of Biology, Brown University, Providence, R. I., for the suggestion which led to this observation.

mens were obtained from the 85 milk handlers. The number of men cultured each week averaged 63 and none of them was cultured more than once during any one week.

The use of moist Loeffler's slants for primary field cultures proved of no value since not a single positive subculture out of 300 was obtained by this method, whereas 15 of these specimens yielded positive results on one or more of the three sets of primary cultures on blood agar plates. Similar results were experienced with the use of dextrose broth as an enrichment medium after swabbings had been transmitted through the mail. As a consequence, these two lines of investigation were discontinued.

Of the 1,512 sets of throat and nose cultures made, 85 (5.6 per cent) were positive for beta hemolytic streptococci by one or more of the three duplicate blood agar cultures. Of the 1,512 "immediate" cultures on the rabbit blood agar, 65 (4.3 per cent) were positive. "Immediate" cultures on sheep blood agar yielded 69 positive findings in a total of 1,512 (4.5 per cent). A significant decrease was noted with "delayed" cultures on sheep blood agar which gave 33 positive cultures out of 1,512, only 2.2 per cent.

Of the 756 culturings on 85 individuals (throat and nose cultures in each instance), 64 (8.5 per cent) were positive from one or both sources by "immediate" culture on the rabbit blood agar; 66 (8.7 per cent) by "immediate" culture on sheep blood agar; only 30 (4.0 per cent) by "delayed" culture on sheep blood agar. Of the "immediate" cultures made from the first of the duplicate swabbings taken, 10 per cent were positive as against 7 per cent with the second of the duplicate swabbings. However, the first swab yielded 3 per cent positive by "delayed" culture and the second 5 per cent. There appeared to be no difference between sheep blood agar and the rabbit blood agar for this type of work.

During the period of this study 20 (23.5 per cent) of the 85 men gave positive cultures for beta hemolytic streptococci at one time or another. Of the 65 giving negative cultures throughout, 8 were cultured less than 3 times in all.

Six of the 20 individuals found positive were detected only by "immediate" cultures; 1 was detected only by "delayed" cultures and this individual was positive only once.

A further analysis of the results brings out certain facts relating to the transiency of the carrier state. One individual was found positive in the only 3 weeks during which he could be cultured. The second and third positive cultures were obtained in this case in the 4th and 5th weeks following the first. Two individuals were positive in 3 out of 4 weeks cultured, with 1 intervening week negative. Four individuals were consistently positive; 1, 10 times in 10 weeks; 1, 10 in 11; 1, 11 in 12; 1, 12 in 12. One man was positive 6 times in 10 weeks, 5 of these times in successive weeks. Another individual cultured 11 times was positive for 2 consecutive weeks, with a third and final positive culture 4 weeks after the second. Five men were positive only twice out of 10 or more times cultured although not on successive weeks. In 3 of these instances the second positive culture was obtained 2 weeks after the first; in the other 2, 6 weeks after the first positive culture. Five individuals were positive only once. These 5 were cultured 6, 11, 11, 12, and 13 times respectively.

Some degree of statistical association between positive cultures and acute rhinitis was found, although this association was not great enough to indicate any practical value. By com-

parison, the statistical association between acute rhinitis and positive throat cultures was somewhat greater in this series. Perhaps this may have been due to the beta hemolytic streptococci present in deep tonsillar crypts emerging to the surface membranes under the influence of favorable environmental conditions following lowered host resistance, or to drainage into the throat from some focus not reached in swabbing the nose.

A statistically significant association was found between positive throat cultures and concurrent acute pharyngitis or tonsillitis. Thirteen of the positive cultures were associated with these conditions which were observed 22 times out of 756 observations. The association, however, was not close enough to be of practical value. The association between positive cultures and concurrent symptomatology in both throat and nose was greater.

The 5 individuals who showed positive cultures 6 or more times may be regarded as persistent carriers. One of these had a highly significant clinical history. He had been ill in bed for 17 days during the month before this study was begun, with a condition diagnosed as "quinsy sore throat." He later stated that he still had a sore throat when he returned to work. His tonsils were always slightly swollen and red with a small amount of purulent exudate on the surface. Cultures from this man were positive for beta hemolytic streptococci in every week of the study. One other persistent carrier usually complained of a "head cold," and once or twice of a "scratchy throat." His tonsils were small, clean, and apparently normal. The remainder seldom complained of symptoms although an acute rhinitis was found at least once in each case during the study. Two of them possessed small tonsils, normal in appearance. The third stated his tonsils had been removed during his childhood and that he never had had a sore throat. No tags of tonsillar tissue were observed in this man's throat.

The 15 individuals showing positive cultures once, twice, or three times during the study gave the following histories: 3 presented distorted, buried and hard tonsils showing occasionally an excess of debris in the crypts; 3 others had had their tonsils removed several years before and rarely suffered from pharyngitis; the remaining 9 had tonsils essentially normal in appearance. Seven of this group never showed any clinical findings of significance within the scope of the examination.

During the study 40 of the 85 men gave no significant clinical or laboratory findings although 5 of these were observed only 3 times or less. There were 25 individuals who showed symptoms of acute rhinitis, pharyngitis, or tonsillitis at one time or another without ever yielding a positive culture. Three of these were cultured less than 4 times. In this group of 25, acute rhinitis was by far the most common clinical feature.

The results of the biochemical and serological studies demonstrated but little difference between the several strains. Of 77 strains isolated in pure culture, 10 gave a final pH below 4.8 in dextrose broth. The lowest reading obtained was pH 4.2. None of the 77 cultures hydrolyzed sodium hippurate, and only 2 reduced methylene blue in milk cultures. All fermented trehalose but not sorbitol. All gave strong precipitin reactions with our group A antiserum. A slight cross-reaction was noted in the majority of instances with group C antiserum but in no instance with antisera for groups B and D. This cross-reaction was noticed particularly by the ring-test reading and often appeared less strong or disappeared altogether when the over night readings were made.

A number of strains isolated were subjected to tests to determine their fibrinolytic activity * against human fibrin, since studies by Tillett and Garner,[8] Dennis and Berberian[9] and Tillett[10] indicate that this property is closely associated with the virulence or invasive power of a strain. Of 14 strains from 14 individuals so tested, 9 produced fibrinolysis in from 3 to 45 minutes; 2 required 1 to 4 hours; 3 were either negative or required 10 to 12 hours.

DISCUSSION

One comparison serves to show that the milk handlers studied formed a representative group. In this study 4 per cent of throat and nose cultures (considered in combination) were positive from one or both sources by "delayed" culture. During this same period the percentage of positives found by routine state-wide milk handler examinations was 3 per cent. The "delayed" cultures in this study are in all respects comparable to the cultures formerly made routinely on milk handler specimens in Connecticut.

Despite the high carrier incidence found, no outbreaks occurred among consumers of milk from the dairies under study, perhaps because sufficiently large doses of the organisms did not reach the milk. Probably this situation would hold true in general until infection of a cow's udder by a milker or some gross contamination of the milk by other means occurred, since studies of the strains isolated failed to show any distinguishing characteristic which would separate them from known pathogenic varieties. None of the strains showed the mucoid characteristics which have been described for organisms associated with certain milk-borne outbreaks of septic sore throat, but in our practical experience non-mucoid varieties are often the etiological agents in milk-borne streptococcus infections. No attempt was made to determine the toxigenic properties of the strains since the invasive power of these organisms is not necessarily associated with ability to produce an exotoxin. Certain variations were observed in the fermentative action on dextrose of the strains as determined by final pH readings in broth cultures. These readings varied more widely with cultures isolated at different times from the same individual than with cultures from different persons. Two cultures reduced methylene blue but all other cultures from the same individuals failed to do this. Although extracts from many of the strains gave cross-reactions with Group C precipitin serum, the reactions obtained with group A antiserum were much stronger and very clear-cut. Furthermore, reciprocal cross-reactions of the same degree could be demonstrated with the sera used when tested against extracts of the stock strains obtained from Dr. Lancefield which were used for immunizing the rabbits. Therefore, reactions with group C antiserum were undoubtedly nonspecific and we were dealing with group A streptococci in every instance. This is further borne out by the failure of the strains to attack sodium hippurate and sorbitol and their ability to ferment trehalose.

The fibrinolytic studies suggest that a large majority of the strains were potential human pathogens since the studies of other workers[8, 9, 10] indicate a close association between the invasive power of strains of beta hemolytic streptococci and their lytic action on human fibrin.

It is of interest to note here that the beta hemolytic streptococci isolated by routine examinations of specimens from milk handlers throughout the state

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* We are indebted to Dr. W. D. Tillett, Johns Hopkins Hospital, Baltimore, Md., whose kind offer to make these studies made it possible for us to secure these data.

while this study was in progress had the same general characteristics as those isolated from the selected group.

Our results clearly indicate that satisfactory means for controlling milk-borne streptococcus infections have yet to be devised. Although doubtless much can be accomplished by furthering the use of pasteurization by greater efforts to eliminate mastitis in dairy herds and by educational methods, no specific mode of attack seems adequate with our present knowledge.

CONCLUSIONS

1. Moist Loeffler's blood serum slants did not prove satisfactory as primary field cultures for detecting milk handlers who were harboring beta hemolytic streptococci in the throat or nose.

2. Sheep blood agar (pH 6.6–7.0) was as efficient as neopeptone-Savita-rabbit blood agar (pH 7.4–7.6) for the growth and detection of beta hemolytic streptococci.

3. Transportation of throat and nose swabbings through the mails resulted in a reduction of approximately 50 per cent in positive findings as determined by making controlled cultures (756 throat and 756 nose) in duplicate before and after transportation. The time elapsing between collection and plating after transportation was approximately 18 hours. Even enrichment cultures in broth after transportation were not so efficient as simple surface inoculation on blood agar; in fact, they were entirely unproductive.

4. Twenty (23.5 per cent) of 85 milk handlers in the representative group selected harbored beta hemolytic streptococci, in throat or nose secretions or both, at least once during the 3 months of the study as determined by weekly cultures. This occurred during January, February, and March, the months when the incidence of positive findings is at its peak in Connecticut.

5. Five of the 20 individuals showing positive cultures were persistent carriers of the organism throughout the study.

6. In the 756 observations made, the association between positive laboratory findings and such clinical symptoms as acute rhinitis, pharyngitis, and tonsillitis, while statistically significant, was not sufficiently close to be of practical value for control purposes.

7. Individuals without tonsils or remnants of tonsillar tissue may be persistent carriers of beta hemolytic streptococci in the absence of significant clinical findings.

8. Our results indicate that strains of beta hemolytic streptococci found in individuals in an average state of health are indistinguishable on the basis of biochemical and serological characteristics from strains of known pathogenicity for man. Assuming the lytic action of any strain on human fibrin to be associated with its invasive power, the majority of these strains are potential human pathogens.

9. With regard to the problem of milk-borne streptococcus infections and under climatic and other conditions similar to those under which this study was made, our results indicate that:

a. Physical examinations alone are not sufficient for the detection of all carriers of beta hemolytic streptococci.

b. Routine laboratory cultures are inadequate for the detection of all carriers, unless made more frequently than is practicable under ordinary administrative conditions.

c. Beta hemolytic streptococci do not withstand drying and other factors associated with delay in transportation to the laboratory sufficiently well for the detection of carriers in a central laboratory with any adequate degree of completeness.

d. Two types of carriers of these organisms, transient (or occasional) and persistent occur among milk handlers in an average state of health, and the organisms of this type carried are potentially pathogenic for man, should sufficient numbers find access to the milk.

e. The percentage of persons harboring these organisms is too large to permit adequate control of milk-borne streptococcus infections by employing any practical measures to eliminate the carriers.

f. Since the frequency of the carrier state seems to bear no close relationship to the frequency of milk-borne streptococcus infections, outbreaks probably occur only when a comparatively large inoculum of infecting organisms reaches the milk from an udder infected by a milker or, probably less often, from some other source.

g. Consumers must be protected against milk-borne streptococcus infections by other means than by periodic physical and laboratory examinations.

NOTE: The authors wish to express their appreciation to Betty Robinton for technical assistance.

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Use of the Terms "Sterile," "Sterilize" and "Sterilization"

IN an official communication from the Food and Drug Administration of the U. S. Department of Agriculture, the Council on Pharmacy and Chemistry of the American Medical Association was asked to express an advisory opinion as to the use of the terms "sterile," "sterilize," and "sterilization," especially when it appears on the labels of agents used "for sterilization of the skin."

The Council adopted the following statement and authorized its transmission to the Food and Drug Administration:

The Council on Pharmacy and Chemistry has formally gone on record as disapproving the use of the terms "sterile," "sterilize," and "sterilization" in a bacteriologic sense other than in their correct scientific significance; *i.e.*, meaning the absence or destruction of all microörganisms. These terms are not relative and to permit their use in a relative sense not only is incorrect but opens the way to abuse and misunderstanding. It is questionable that there are any chemical agents tolerated by the skin which will produce sterility, although there are some which will reduce the bacterial flora of the skin to such an extent that they may properly be described as disinfecting agents. For such agents there is no objection to the use of the terms "disinfecting," "bactericidal," and "bacteriostatic."

Reference was also made to the decision of the Committee on Foods, which is as follows:

Use of Terms "Sterile," "Sterilized," and "Sterilization." The terms *sterile, sterilized* and *sterilization* shall be used in food advertising in their correct scientific significance only. Foods processed to be free of pathogenic organisms or to keep sound and wholesome are not necessarily sterile, *i.e.*, free from viable microörganisms.

—*J.A.M.A.*, July 4, 1936, page 38.

Lumber Camp Inspections

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UNTIL very recently, Maine, in common with most lumbering states that have depended upon remoteness to make lumber camps safe, had given little attention to the sanitary inspection of them. The condition continued, not because the health authorities were remiss, but from a lack of both inspection personnel and legislative authority. In 1931, two relatively small outbreaks of typhoid occurred almost simultaneously at separate camps of the same operator. Indeed, although never so proved and although the camps were located on separate watersheds, their close proximity indicated that the two outbreaks were in effect only one.

The moving incidents are fairly typical of under-regulated lumber camps, wherever located. In Camp Number 1, an open privy was distant only 100 feet from the building where the crew ate. Swarms of flies had easy access to both places. In Camp Number 2, in addition to the same hazards, there was the insanitary situation of a privy built on the bank of a stream above the pool from which the camp water supply was drawn. In accordance with the practice of the Bureau of Health, men of both crews were immunized, and the hazards ordered abated. Parenthetically, one man who had been infected remained a carrier for more than 4 years.

The department, or more definitely the Division of Sanitary Engineering to which was charged the supervision of lumber camps, moved to start routine inspections. It had long been established that such camps, if under only desultory inspection, were excellent culture ground for filth diseases. Still worse, since workmen were drawn from widely separated homes, the breakup of the camps at the end of the working season made the camps the best possible focal points for spreading the disease.

The procedure and experience of the Division of Sanitary Engineering may be interesting. A program of education of lumber operators was plainly indicated. Accordingly, there was called a conference of the division, with representative operators from the membership of the Timber Land Owners' Association. The necessity of adequate camp sanitation and the responsibility of camp operators for the public health were studied and carefully discussed.

The good will gained by the contacts made at this conference still persists, simplifying greatly the work of subsequent supervision, for the committee chosen from among the operators took over the task of extending the good will throughout the whole number of their organization. In that manner, generally by word of mouth, was carried out a campaign of education.

Moreover, this committee with the division's engineers developed a set of regulations agreeable to both the department and the members of the Timber Land Owners' Association. Presented by the joint committee to the Advisory Council of the Bureau of Health and Welfare, the regulations

reached formal approval on December 5, 1933. The 20 sections of regulations which have the force of law, provide for proper location and camp layout, water supply and handling, disposal of wastes, proper toilet and washing facilities, screening, dishwashing, the supply, handling and refrigeration of foods and milk, precaution against spread of infections and vermin, the manner of abandoning camp, provision for a caretaker, fixing responsibility for carrying out the provisions and finally fixing a nominal fine for failure to adhere to the rules.

The Division of Sanitary Engineering considers the program begun in 1931 well justified. During the year in which the Rules and Regulations became law, inspectors visited 143 camps which employed 4,647 men. Five typhoid carriers were found, either as cooks or cook's helpers, called cookees. These people were removed from camp, and typhoid immunization recommended. As a result, nearly 1,000 employees received anti-typhoid inoculations.

In the following year, the inspections showed that of the same number of camps with 5,184 employees, 86 had made substantial improvements in sanitary conditions.

The Division of Communicable Diseases of the Bureau of Health reports that no cases of typhoid fever have been traced to lumber camps since the enactment of definite regulations and the inauguration of routine inspections.

Birth Certificate

EIGHT-YEAR old Agnes was frequently sent home from school for forgetting to bring written excuses for tardiness or absence from classes. One day she was sent home to bring an important document, the birth certificate of her little brother Billy, who was just starting to go to school. Her mother handed her the certificate and cautioned her to take good care of the precious paper.

Agnes turned up at school crying.

"What's the matter now?" asked the teacher.

"I've lost Billy's excuse for being born!" she wailed.

Immediate Allergic Response Following a Schick Test

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AN immediate allergic reaction following a Schick test in individuals who have been immunized against diphtheria is unusual. Recently Harrison [1] called attention to the fact that McGinnis * observed a number of reactions of the immediate type in children who were given a Schick test 8 weeks after receiving an injection of alum precipitated diphtheria toxoid. To one of these individuals it was necessary to give an injection of adrenalin. This report deals with 2 reactions of this type in persons who were given a Schick test some time following immunization with alum precipitated diphtheria toxoid.

The first instance was in a graduate nurse who in 1925 received 3 doses of toxin-antitoxin without a preliminary Schick test. In 1927 a negative Schick test was reported. In 1931 she was employed in Vanderbilt Hospital and a routine Schick test resulted in a "combined reaction." No immunization was attempted at that time. During the years 1932 and 1933 this nurse was either not employed in the institution or was away from work on account of illness. In September, 1934, she returned to work and another Schick test was done with a questionable "positive reaction." On November 19, 1934, the Shick test was repeated and a "positive reaction" was obtained. On December 5, 1934, one subcutaneous injection of 0.5 c.c. of alum precipitated diphtheria toxoid was given after a toxoid skin test was found to be negative. On January 2, 1935, a Schick test was negative. In a routine check-up of all nursing personnel who had received diphtheria immunization during the previous year another Schick test was done on this individual on May 23, 1935. With each of these Schick tests control tests were made in the opposite arm with heated diphtheria toxin.

From 15 to 30 minutes following the Schick test on May 23, 1935, the patient developed marked local reactions at the sites of injection. In some respects these were similar to the immediate reactions described by Neill, Fleming, and Gaspari [2] following the intracutaneous injections of diphtheria culture filtrates. The edema in the arm into which unheated diphtheria toxin was injected was perhaps somewhat more marked than in the arm receiving heated toxin. Shortness of breath, swelling of the face and eyelids, together with itching and urticaria over the upper part of the chest followed immediately. The patient was given a subcutaneous injection of adrenalin and the shortness of breath, itching, and urticaria slowly subsided. The edema at the sites of injection of

* Personal communication to Harrison, 1935.

the heated and unheated diphtheria toxin disappeared more slowly than did the itching, edema, and urticaria over the face and chest.

The second reaction of this type was encountered in a medical student who in November, 1934, was found to have a positive Schick test. A control test with heated diphtheria toxin at that time was negative. A toxoid skin test was performed a few days later and was found to be negative also. This student was given 0.5 c.c. of alum precipitated diphtheria toxoid subcutaneously on December 5, 1934. Four weeks later another Schick test was performed. It was positive and a control test with heated toxin was negative. In order to determine whether or not a dosage of 0.5 c.c. was sufficient to immunize, no further injections of alum precipitated toxoid were made. A Schick test 8 weeks after the single injection of alum precipitated toxoid was negative. To determine whether or not the immunity which had developed was lasting another Schick test was made on May 22, 1935. It was negative.

In October, 1935, 10 months after the single injection of alum precipitated diphtheria toxoid, this individual received a Schick test and a control test with heated diphtheria toxin. Within 10 minutes after the injections it was noted that a marked immediate local reaction developed at the sites of injection similar to those observed in our first case. Immediately following the development of the local reaction the patient developed dizziness, suffusion of the eyes, and became very uncomfortable. The reactions at the sites of injection increased in size and edema developed over these areas. Burning and itching of the feet and of the upper part of the chest and axillae then developed. A few small urticarial lesions developed over the arms. Following a subcutaneous injection of adrenalin the symptoms subsided slowly and after about an hour and a half the urticaria and the itching had practically disappeared although the patient still complained of feeling uncomfortable. A scattered urticarial eruption reappeared on the arms a few hours later. These disappeared, however, after the oral administration of ephedrine sulphate and no further symptoms were noted.

In the other patient no further reaction occurred after the immediate allergic reaction subsided. In each individual both the tests with the heated and unheated diphtheria toxin were negative after 4 days.

These 2 instances of hypersensitiveness, apparently induced by immunization with alum precipitated diphtheria toxoid are the first in our experience. Since neither of the individuals exhibited reactions to the heated toxin before immunization, and since the manifestations of hypersensitiveness followed retesting after a subcutaneous injection of alum precipitated toxoid, it seems probable that these patients became sensitized as a result of the immunization with the alum precipitated toxoid. A similar experience with alum precipitated toxoid has been observed by McGinnis. It seems not unreasonable to predict an increasing incidence of such reactions in the future as a result of the more extensive use of alum precipitated toxoid in diphtheria immunization. This should be borne in mind when individuals who have been immunized are subsequently given Schick tests in order that appropriate procedure for the control of an immediate allergic response may be instituted.

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Inhibitory Action of Colloidal Sulphur in Corper's Agar on the Growth of Four Strains of Mycobacterium Tuberculosis Hominis

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LAWSON and Bengtson [1] found that the growth of a strain of *Mycobacterium tuberculosis hominis*, which was isolated from sputum in the spring of 1933, was inhibited by the addition of 1.5 mg. of colloidal sulphur per 100 ml. of Corper's potato-glycerin agar.

This paper is a brief report of work done in collaboration with the above mentioned workers. Four strains of *Myc. tuberculosis hominis* were used, including the strain used by Lawson and Bengtson. Strain " L " was culture No. 4173 of the American Type Culture Collection. It was isolated by E. J. Lynch, Laurel Heights, Shelton, Conn., May, 1927, and was still virulent to guinea pigs in September, 1927. It came to us on glycerin agar, and probably had been so maintained for a number of transfers. After the third transfer on Corper's potato agar it proved to be a very rapid grower.

Strain " H " was obtained from Dr. Zinsser of Harvard, and was referred to by him as an old laboratory strain originally isolated in Saranac, N. Y. We judge this to be the well known " H-37 " strain. This culture was on egg medium when received.

Strain " R " was obtained from Dr. Theobald Smith of the Rockefeller Institute. It was isolated from human sputum by passage through a guinea pig in April, 1933, and had been maintained on egg medium.

Strain " C " was that studied by Lawson and Bengtson and isolated by the latter from sputum in April, 1933. It was received on Corper's agar, on which medium it had passed several generations. Strain " C " was the only one accustomed to Corper's agar when received in this laboratory. Consequently, the results with the first few series of cultures compared with the other strains show discrepancies which, no doubt, were due to the change of culture media.

The medium used was Corper's potato-glycerin agar prepared by the same procedure as followed by Lawson and Bengtson in their work. The reaction of the medium was adjusted colorimetrically to a pH of 7.2 to 7.4, after which the hot agar was distributed into bottles containing sulphur. These were autoclaved for 20 minutes at 15 lb. pressure, removed from the autoclave, the hot agar tubed aseptically into 17 mm. diameter tubes, and slanted in pans of crushed ice. Inoculations were made by smearing a loop of a physio-

* This work was done while Mr. Snider was a Fellow in Bacteriology in the Virginia Polytechnic Institute.

logical salt suspension of the organisms over the surface of the slant. The tubes were closed by inserting a paraffined cork above the cotton plug. A groove was cut in one side of the cork for ventilation.

The following conclusions seem to be warranted:

Strain " L," an old culture of *Myc. tuberculosis hominis*, is a very rapid grower on Corper's agar (good growth appearing in several days), and tolerates at least 200 mg. of colloidal sulphur per 100 ml. of agar; however, some inhibition is noticed on agar containing between 7 mg. and 200 mg. of sulphur. Tests indicate that this strain is only slightly, if at all, virulent for guinea pigs.

Strain " H " tolerated 5 mg. of colloidal sulphur per 100 ml. of Corper's agar, though very little growth is obtained on agar containing this amount of sulphur. It is indicated that this strain is moderately virulent for guinea pigs.

The recently isolated strains, " R " and " C," did not grow on agar containing more than .1.5 mg. of sulphur per 100 ml. These strains are of practically the same age and were found to be highly virulent for guinea pigs.

The original experiments were suggested from observations of Dr. Lawson of the statistics of the incidence of tuberculosis among workers in the dust trades; which indicated that there is a lower incidence among sulphur workers. Our work indicates that there is a negative correlation between the virulence of the organism and the amount of sulphur tolerated. It is apparent that a much larger number of tests must be made before anything positive may be stated as to such a correlation, and we cannot, as yet, give any explanation as to the apparent lower incidence of tuberculosis among sulphur workers. While our results are drawn from study of hundreds of cultures of 4 strains it is essential that the tests for sulphur tolerance be made with a much larger number of strains. We are also unable to explain the reasons for the inhibitory action of sulphur but would venture the hypothesis that by direct action on the sulphur the organism produces toxic thionic acids or thionates. During the process of autoclaving the medium some hydrogen sulphide is evolved, but this is not enough to inhibit growth, as has been shown by experiments. There does not seem to be enough change in the pH of the medium to check growth.

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Causes of Insanity

IN a recent total of 660 cases of Insanity studied by the American Medical Association, the statistics of the causes of insanity were reported as follows:

Drunkenness, 110; Social diseases, 100; Ambition, 73; Excessive Labor, 73; Misfortune, 69; Old age, 69; Disappointment, 54; Love, 47; Religion, 29; Politics, 26; Crime, 10.

Significance of the Small Variety Endameba Histolytica*

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IN December, 1933, the *E. histolytica* producing small variety cysts attracted attention in Chicago and soon assumed a prominent rôle in the parasitology of the human intestinal tract. It reached its climax in June, 1934; declined gradually until December, picked up again in January, February, and March, 1935; and declined until September, 1935. Now it is almost impossible to find an individual heavily infested with the small variety *E. histolytica* cysts.

E. histolytica is a collective species composed of distinct strains differentiated by the size of their cysts. Wenyon and O'Connor state: "Cysts of *E. histolytica* vary greatly in size. There occur strains of *E. histolytica* 7–10 microns in diameter, strains with intermediate cysts, and finally large strains with cysts 15–19 μ in diameter."[1] Also, "Cases infested with the small strain pass small cysts regularly, at any rate for some weeks, with no tendency for the small cysts to be replaced by the larger ones."[1]

In 1909, Elmassian[2] described the first precystic stage of *E. histolytica*, considering it a distinct species and naming it "E. minuta" as distinguished from *E. histolytica*, the large form. He stated that *E. minuta* give rise to cysts 10–16 μ in diameter.

In 1912, Prowazek[3] called these "*E. hartmanni*." In 1913, Kuenen and Swellengrebel[4] called the large *E. histolytica* forms "*E. tetragena*" and the precysts "minuta" forms. They give the following measurements for *E. histolytica*: *E. histolytica* 20–40 μ, "minuta" stages 12–20 μ, and cysts 10–15 and rarely 19 μ. In 1914, Ujihara[5] encountered very small as well as large cysts: 10–13 μ, rarely 3.4–4.27 μ. Wenyon and O'Connor,[1] 1917, give 7–19 μ as the diameters for *E. histolytica* cysts. In 1917–1918, Dobell and Jepps,[6] in their study of the diverse races of *E. histolytica* found that the cysts vary from 5–20 μ in diameter; 7–8 μ being commonest among the small cysts. They found that different races of *E. histolytica* may coexist. Brug,[7] 1917, gives 7–20 μ (average of 10–15 μ) for *E. histolytica* cysts. Dobell and O'Connor,[8] 1921, give very careful descriptions of *E. histolytica* and discuss their various races. Brumpt,[9] 1927, speaks of *E. minuta* as a non-pathogenic ameba producing cysts 5–10 μ in diameter. Craig,[10] 1934, reviews the literature on the subject and quotes the work of Dobell and Jepps, who have described 5 races of *E. histolytica* differentiated

* Read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

by the size of cysts produced: 6.6, 8.3, 11.6, 13.3, and 15 μ. He quotes Boeck,[11] who divides the races into 3 groups: small, having cysts 6–9 μ, medium with cysts 10–12 μ, and large, 13–15 μ in diameter.

It may be well to cite the essential characteristics of the *Endameba histolytica* which produce large cysts and differentiate from it those producing small cysts.

TROPHOZOITES

Cytologically the trophozoites of *E. histolytica* have clear, hyaline, refractile, glass-like ectoplasm and finely granular endoplasm. The ectoplasm is best seen in the motile amebae. The motility is usually in a straight line by means of a single large, blade-like pseudopodium which moves rapidly and explosively. Usually the nucleus flows into the pseudopodium first, the red blood cells, if present, and finely granular material follow it. In fresh bloody mucous stools (from acute cases of amebic dysentery) the motility is very rapid. In cold stools the organisms are sluggish and the pseudopodia are more commonly blunt.

In stained preparations (iron hematoxylin) the nuclear membrane appears thin and delicate, upon the inner surface of which is a ring of minute chromatin granules. In the center of the nucleus or less commonly slightly eccentrically is a small black dot of chromatin, the karyosome which is about 0.5 μ in diameter. The karyosome is surrounded by a clear achromatic zone or halo. Between the karyosome and the peripheral layer of chromatin granules is an achromatic linin network. In degenerating amebae, however, there may be masses of chromatin in this network.

PRECYSTIC STAGE

Before encystment the active forms leave the tissues, enter the lumen of the gut where they undergo one or two divisions, diminish in size, lose motility, rid themselves of red blood cells, become spherical or oval in shape, and thus become precysts. In the living unstained condition the precystic *E. histolytica* appear colorless, hyaline, or finely granular, round or slightly oval, measuring 6–20 or more μ in diameter. The distinction between ecto- and endoplasm is less apparent than in the trophozoites. Progressive motility is absent, although blunt pseudopodia may be sent out, but the organisms commonly remain stationary. The nuclear structure is the same as in the trophozoite and the nucleus is usually more clearly visible. The precyst secretes a delicate wall and encysts.

CYSTIC STAGE

In living unstained preparations (saline or water) the cysts appear as colorless, hyaline bodies, usually round, but they may be oval. The cyst wall is refractile, fairly thin, and has a double contour. The nuclei appear as refractile bodies. The chromatoid bodies appear as refractile bars or rods with blunt ends. The cytoplasm is free from inclusions and appears clear. In iodine preparations (5 per cent aqueous potassium iodide saturated with iodine and diluted with equal parts of distilled water for use) the cyst and nuclear walls appear dark brown, the glycogen stains a diffuse brown, and the karyosome appears as a refractile dot. In iron hematoxylin preparations the cytoplasm appears bluish gray, the chromatoid bodies as black rods with blunt ends, the karyosomes and nuclear walls black. The glycogen appears as a vacuole. In old cysts the glycogen and chromatoid bodies are usually absent (used up as reserve food). In cysts with 1 and 2 nuclei the nuclear membrane is usually the same as in the trophozoite, but in the 4 nuclear stage the nuclei are smaller and membrane finer.

The *E. histolytica* producing small cysts differ from those producing large cysts physiologically, culturally, immunologically, clinically, and in pathogenicity for lower animals.

The trophozoites of the *E. histolytica* producing small cysts are usually smaller and not so motile as those producing large cysts, and they do not ingest red blood cells.

Bloody mucous stools from acute cases of amebic dysentery usually show quite large and very motile trophozoites, whereas the trophozoites found in soft stools from mild cases of amebic dysentery and carriers are usually smaller in size, approaching those giving rise to the small variety *E. histolytica* cysts.

The *E. histolytica* producing small variety cysts differ culturally from those producing large variety cysts. They grow infrequently (5–8 per cent) and with greater difficulty in Cleveland and Collier's medium * in which the large variety grows readily and luxuriantly. In my experience, cultures for *E. histolytica* from bloody mucous stools of active cases of amebic dysentery were positive in 100 per cent of the cases (49 cases), but only about 95 per cent of the cultures of stools from carriers of the large variety *E. histolytica* were positive (30 carriers). These figures are of clinical patients seeking medical care and are higher than those of food handlers, some of whom take amebicides before coming for examination in order to get a negative report, the reason being that they may retain their positions or get new ones. Arsenic was found in some of the stools that showed large variety *E. histolytica* cysts which failed to grow in culture.

In culture the trophozoites of the small variety may be small or they may be as large as those of the large variety. They may be long and slender or short and slender. The morphology and motility are identical with those producing large cysts.

The cultures of the small variety *E. histolytica* must be sub-cultured every 24–48 hours, whereas those of the large variety need not be sub-cultured so frequently—every 48–72 hours is sufficient. The *E. histolytica* producing small cysts differ immunologically from those producing large cysts. They fail to give positive complement-fixation when the antigen prepared from the sediment of cultures of *E. histolytica* producing large cysts is used in tests with serum from patients infected with the small variety *E. histolytica*. Complement-fixation tests with sera from 25 patients infected with the small variety *E. histolytica* were thus run, all of which gave negative reactions, whereas sera of untreated cases of the large variety *E. histolytica* tested similarly gave strongly positive reactions in almost every instance. See Table I.

TABLE I

SHOWING THE CORRELATION BETWEEN INFECTION WITH E. HISTOLYTICA (LARGE VARIETY) AND COMPLEMENT-FIXATION TESTS USING THE ANTI-SHEEP SYSTEM

E. histolytica Infection	*Complement-Fixation Tests* +	*Complement-Fixation Tests* —	*Total*
Pos. dysentery	13	3	16
Pos. carriers	2	3	5
Neg.	15	135	150
Total	30	141	171

CLINICAL ASPECTS

The clinical picture is rather indefinite, but the patients frequently

* The medium consists of 30 gm. liver infusion agar (Digestive Ferments Co., Detroit, Mich.), 3 gm. dehydrated sodium phosphate, 1,000 c.c. distilled water. Dissolve, tube, autoclave 15 lb. for 30 minutes and slant. These slants are overlaid with sterile serum—saline (1–6), sterilized by filtering through a Berkefeldt filter and testing for sterility. Wassermann negative human inactivated serum, horse, rabbit, or other sera may be used. A little sterile rice flour or rice starch is added to the medium before making sub-cultures if one desires to maintain positive cultures. Rice starch or rice flour need not be added for diagnostic purposes.

TABLE II

No. of Cases: Diarrhea +	Diarrhea −	Blood +	Blood −	Symptoms: Abd. Pain	Abd. Distress	Cramps	Constipation	Loss of Wt.	Fatigue	Recurrent Diarrhea
39	43	2	80	11	18	5	6	1	1	5

Duration of Symptoms: 1–7 Days	1–3 Wks.	1–3 Mos.	4–6 Mos.	6–12 Mos.	1–3 Yrs.	4 Yrs.	10 Yrs.	Effect of Medication, Symptoms: Disappeared	Improved
9	5	17	10	7	7	1	1	15	5

3 cleared on medication and 1 improved.

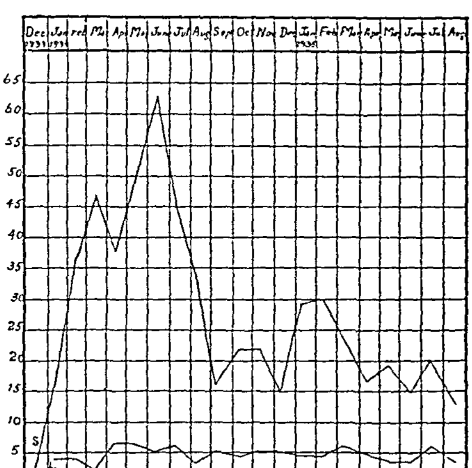
complain of distress and crampy pain in the abdomen followed by 2 or 3 soft stools usually in the morning, a feeling of fatigue, and the elimination of large amounts of gas. Ulceration of the rectum, pus, gross blood, or evidence of organic involvement of the colon have not been encountered nor have liver abscesses been observed with this variety.

The data[12] of 82 cases (7 food handlers of whom only 1 complained of abdominal cramps) are of interest (Table II).

Practically all of the data in Table III are of persons with sufficient intestinal symptoms justifying stool examinations for *E. histolytica*. Routine stool examinations were not made of hospital and clinic patients. (There were, however, several food handlers and contacts with clinical cases.)

There is a difference of opinion as to whether the *E. histolytica* producing the small cysts are pathogenic. The symptoms are much milder than those caused by the large variety, yet they seem to be typical and are eliminated upon specific treatment, especially if the symptoms are of short duration. (The longer the duration of the symptoms, the less readily did the patients respond to amebicidal treatment.) A number of persons, including members of the staff, infected with the small variety *E. histolytica* have been observed whose complaints seemed to have been typical and whose symptoms cleared up upon specific medication. Until we know more about these organisms, infected persons showing symptoms should be treated.

In our experience, liver and lung abscesses have not been produced by the small variety *E. histolytica*. In none of our cases of amebic liver or lung abscesses were we able to find small cysts in the stools, whereas in every such case the large variety *E.*



S = Small
L = Large

FIGURE I—Showing Number of Cases of Amebiasis Among the Clinic and Hospital Patients at the University of Chicago Clinics from the Summer of 1933 to September, 1935.

histolytica had been found. (We have had 4 patients with liver abscesses and 2 with both lung and liver abscesses.)

Our experiments on the pathogenicity for lower animals are still in progress. Thus far, by feeding experiments, we have been able to infect 8 out of 37 kittens with the small variety *E. histolytica* cysts, of which 2 showed minute ulcers of the large bowel, and 10 out of 22 with the large variety.

Intra-rectal inoculations of kittens with bloody mucous stools from amebic dysentery as well as with cultures of the large variety resulted in typical and severe amebic ulceration of the large bowels, whereas similar inoculations with cultures of the small variety *E. histolytica* have thus far failed to produce such results.

Faust, on the other hand, has observed fulminating dysentery in dogs resulting from small cysts taken from human carriers.

DISCUSSION

In the summer of 1933 when the Chicago epidemic started we did not encounter the small variety of cysts. They made their first appearance in December, 1933, and soon assumed a prominent rôle, reaching their height in June, 1934, declining gradually until December of the same year, picking

TABLE III

SHOWING THE NUMBER OF CASES OF AMEBIASIS AMONG THE CLINIC AND HOSPITAL PATIENTS AT THE UNIVERSITY OF CHICAGO CLINICS, FROM THE SUMMER OF 1933 TO SEPTEMBER, 1935

Month and Year	*Persons Examined*	*Number Negative*	*Large Variety E. Hist.*						*Small Variety E. Hist.*						*Large and Small E. hist. Coexisting*					
			TPC	*TP*	*PC*	*P*	*T*	*C*	*TPC*	*TP*	*PC*	*P*	*T*	*C*	*TPC*	*TP*	*PC*	*P*	*T*	*C*
May, 1933			May 13 Venzke				June 9 Posius													
June																				
July	22	16	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..
August	18	15	..	1	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..
Sept.	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Oct.	5	5	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nov.	20	18	1	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Dec.	24	20	1	..	2	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..
Jan., 1934	53	33	..	1	1	..	1	..	..	..	5	..	..	10	..	..	..	..	..	1
Feb.	104	64	..	2	..	..	1	..	..	..	4	..	..	32	..	..	..	..	..	1
March	169	112	..	1	..	..	1	..	1	..	5	..	..	41	..	..	..	..	..	..
April	100	56	..	..	..	..	..	3	2	1	5	1	..	26	..	..	1	..	..	2
May	124	70	1	2	..	..	..	1	..	..	8	2	..	37	..	..	..	..	..	2
June	187	104	..	..	..	..	2	1	1	..	8	..	..	52	..	..	2	..	..	..
July	160	110	..	2	..	..	..	1	1	..	15	..	..	25	..	..	..	..	..	3
August	147	101	1	1	..	..	..	..	..	..	7	1	..	24	..	..	1	..	..	..
Sept.	189	73	1	..	..	..	1	1	..	..	2	..	..	12	1	..	..	..	..	1
Oct.	156	112	..	..	..	..	..	1	..	..	2	..	..	17	..	..	1	..	..	2
Nov.	126	99	1	1	..	..	1	..	2	..	6	..	..	12	..	..	1	..	..	1
Dec.	114	87	..	1	..	..	..	2	..	..	2	1	..	10	..	..	..	..	..	2
Jan., 1935	166	127	..	..	..	..	..	2	..	..	2	..	..	25	..	..	1	..	..	1
Feb.	153	108	..	..	..	..	..	2	..	..	1	..	..	27	..	..	..	..	..	2
March	215	170	1	..	..	..	..	3	1	..	1	..	..	20	..	..	..	..	..	2
April	163	141	..	..	1	..	..	3	..	..	1	..	..	16	..	..	..	..	..	..
May	183	147	..	..	..	..	..	2	..	..	..	..	..	18	..	..	..	..	..	1
June	174	134	..	1	..	..	..	1	..	..	..	..	..	14	..	..	..	..	..	1
July	163	116	..	1	1	..	..	3	1	..	1	1	..	16	..	..	1	..	..	..
Aug.	84	56	..	1	..	..	..	1	..	..	1	..	..	11	..	..	..	..	..	1

Note: T = Trophozoites. P = Precysts. C = Cysts.

up again in January, February, and March, 1935, and have been on the decline since then (see Table III).

We do not know where they came from nor what is becoming of them. We know that they appeared in December, 1933, became widely distributed among the people of Chicago and its environs and perhaps in the entire country, assuming a prominent place in the parasitology of the human intestinal tract. When these cysts first appeared, they were typically round and quite numerous, most of the positive stools containing large numbers. This condition persisted for almost a year when more pleomorphic forms, irregular in shape, started to appear, and their incidence as well as number in infected individuals have decreased. At present it seems almost impossible to get a heavily infected specimen.

Table III gives the number of cases of amebiasis by month among the hospital and clinic patients examined from the summer of 1933 to September, 1935, at the University of Chicago Clinics. Under "small" we have included all the varieties from 5 μ or less up to about 12 μ in diameter which includes the intermediate forms.

In our experience, *E. histolytica* may produce cysts ranging from 5 μ or less to 20 μ in diameter. At times one encounters cysts so small that only those well trained at the microscope detect them. Since *E. histolytica* cysts range between 5 μ or less to 20 μ in diameter, thus overlapping *E. coli* and *Endolimax nana*, it is important to differentiate between these cysts.

CONCLUSIONS

1. The *E. histolytica* producing small cysts differ from those producing large cysts—culturally, immunologically, clinically, and in pathogenicity for lower animals.
2. *E. histolytica* comprise many strains or "races" differentiated by the size of cysts produced.
3. These different races may coexist in the same individual.
4. The *E. histolytica* producing small cysts seem to produce milder symptoms than the large variety, but we have no definite evidence that they produce intestinal ulceration. Specific medication seems to eliminate the symptoms as well as the parasites.
5. In our experience liver and lung abscesses have not been produced by the *E. histolytica* producing small cysts. These are produced by the *E. histolytica* producing large cysts.
6. Since the *E. histolytica* cysts vary from about 5 μ or less to about 20 μ in diameter, overlapping *E. coli* and *Endolimax nana* cysts, it is important to differentiate these cysts.

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Public Health Degrees and Certificates Granted in 1935*

THE following tables similar to those published in previous years present the data concerning students registered in schools of public health, and the public health degrees granted in the calendar year 1935.

COLLEGE ENROLLMENT IN PUBLIC HEALTH COURSES

Number of students enrolled, and Public Health Degrees and Certificates conferred in the year 1935 in courses requiring at least 1 year of residence, by American and Canadian Colleges

TABLE I

Name of University	No. of Students Registered 1934–1935			Degrees Offered	No. of Degrees Granted 1935		
	Men	Women	Total		Men	Women	Total
University of California	9	13	22	A.B.	0	2	2
				M.A.	0	0	0
				Ph.D. in Hyg.	0	0	0
				Dr.P.H.	0	0	0
Columbia University	9	2	11	M.S. in P.H.	8	1	9
Harvard School of Public Health	20	0	20	C.P.H.	6	0	6
				M.P.H.	13	0	13
				Dr.P.H.	0	0	0
Johns Hopkins School of Hygiene and Public Health	129	16	145	C.P.H.	27	1	28
				Dr.P.H.	5	1	6
				Sc.D. in Hyg.	6	0	6
				Sc.M. in Hyg.	2	1	3
Massachusetts Institute of Technology	73	8	81	C.P.H.	1	2	3
				Dr.P.H.	0	0	0
				M.S.	1	0	1
				S.B. in P.H.	12	1	13
				S.B. in P.H. Eng.	2	0	2
				Dc.S.	0	0	0
University of Michigan	47	36	83	Dr.P.H.	2	1	3
				M.S.P.H.	10	12	22
University of Toronto	14	0	14	D.P.H.	11	0	11
				Ph.D.	0	0	0
University of Western Ontario	0	0	0	D.P.H.	0	0	0
Wayne University College† of Medicine	0	0	0	Dr.P.H.	0	0	0
Yale University	7	3	10	C.P.H.	2	0	2
				Dr.P.H.	1	0	1
				M.S.	0	1	1
				Ph.D.	0	1	1
Total	308	78	386		109	24	133

* Prepared by the Committee on Professional Education
† Formerly Detroit College of Medicine and Surgery

CLASSIFICATION OF PUBLIC HEALTH DEGREES AND CERTIFICATES GRANTED IN 1935

Number of persons receiving degrees and certificates by reason of public health courses completed:

TABLE II

Degree	*No. of Degrees Granted*	*No. of Schools Offering Degrees*
Certificate of Public Health	39	4
Master of Public Health	13	1
Doctor of Public Health	10	7
Master of Science in Public Health	31	2
Master of Science in Hygiene	3	1
Doctor of Science in Hygiene	6	2
Bachelor of Art in Public Health	2	1
Bachelor of Science in Public Health	13	1
Master of Science	2	2
Bachelor of Science in Public Health Engineering	2	1
Doctor of Philosophy	1	3
Diploma of Public Health	11	2
Total	133	

Number of Degrees and Certificates conferred by American and Canadian Colleges for 1933, 1934 and 1935:

TABLE III

School	*Degree*	*1933*	*1934*	*1935*
University of California	A.B.	1	7	2
	M.A.	0	0	0
	Ph.D. in Hyg.	0	0	0
	Dr.P.H.	0	0	0
Columbia University	M.S. in P.H.	7	7	9
Harvard School of Public Health	C.P.H.	8	6	6
	M.P.H	11	7	13
	Dr.P.H.	2	1	0
Johns Hopkins School of Hygiene and Public Health	C.P.H.	41	37	28
	Dr.P.H.	3	6	6
	Sc.D. in Hyg.	13	16	6
	Sc.M. in Hyg.	8	6	3
Massachusetts Institute of Technology	C.P.H.	9	4	3
	Dr.P.H.	0	0	0
	M.S.	1	3	1
	S.B. in P.H.	13	9	13
	S.B. in San. Eng.	0	5	2
	Ph.D.	1	0	..
	Dc.S.	..	..	0
University of Michigan	Dr.P.H.	2	3	3
	M.S.P.H.	16	12	22
University of Minnesota	B.A. or B.S.	..	0	..
	M.A.	3	1	..
	M.S.	..	0	..
	Ph.D.	1	..	..
University of Pennsylvania *	M.A.	3	0	..
	M.S.	1	0	..
	Ph.D.	1	0	..
	Dr.P.H.	..	0	..

TABLE III (Cont.)

School	Degree	1933	1934	1935
University of Toronto	Ph.D.	0	3	0
	D.P.H.	10	13	11
	M.A.	2	..	..
University of Western Ontario	D.P.H.	0	0	0
Wayne University College of Medicine and Surgery †	Dr.P.H.	1	2	0
Yale School of Medicine	C.P.H.	6	5	2
	Dr.P.H.	3	4	1
	M.S.	1	0	1
	Ph.D.	4	0	1
Total		172	157	133

* School of Hygiene and Public Health discontinued in 1934
† Formerly Detroit College of Medicine and Surgery

Number of Degrees and Certificates in Public Health granted in United States and Canada, 1933, 1934 and 1935:

TABLE IV

Degrees and Certificates	1933	1934	1935
C.P.H.	64	52	39
Dr.P.H.	9	16	10
M.S. in Hygiene	8	6	3
Sc.D. in Hygiene	13	16	6
Ph.D.	7	3	1
B.S.	13	14	13
B.A.	1	7	2
M.A.	8	1	0
M.S.	26	22	2
M.P.H.	11	7	13
D.P.H.	12	13	11
S.B. in Public Health Engineering	..	.	2
M.S. in Public Health	..	..	31
Total	172	157	133

W. S. LEATHERS, M.D., *Chairman*
EUGENE L. BISHOP, M.D.
ALLEN W. FREEMAN, M.D.
LILLIAN A. HUDSON, R.N.
STANLEY H. OSBORN, M.D.
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WILSON G. SMILLIE, M.D.
JOHN SUNDWALL, M.D.
RALPH E. TARBETT, C.E.
HENRY F. VAUGHAN, DR.P.H.
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An Evaluation of Huddleson's Dye Bacteriostatis and Hydrogen Sulphide Methods for the Identification of Brucella*

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THE purpose of this study was to evaluate Huddleson's method for differentiating organisms of the Brucella group. Five state public health laboratories coöperated. The classification of strains is based on ability to grow on thionin liver infusion agar and on basic fuchsin liver infusion agar and on production of hydrogen sulphide. Seventy-five strains which had been previously classified by Huddleson were distributed. The method of classification and the number of strains used were as follows:

	Growth on *Thionin*	Growth on *Basic Fuchsin*	*Hydrogen Sulphide*
23 *Br. melitensis*	+	+	none or trace in 4 days
23 *Br. abortus*	—	+	moderate to marked in 2 days
29 *Br. suis*	+	—	moderate to marked in 4 days

The results from the five laboratories were tabulated and are summarized in the following statements.

Thionin Plates—Agreement was obtained on all the *Br. abortus* and all the *Br. suis* strains. Five of the *Br. melitensis* cultures failed to grow on this medium in two laboratories, and 8 others failed to grow in one of these laboratories.

Fuchsin Plates—Agreement was obtained on all the *Br. suis* strains. One laboratory failed to obtain growth with 1 *Br. melitensis* culture. This same laboratory disagreed with the other four on 4 *Br. abortus* strains and reported indefinite results with 2 other strains.

Hydrogen Sulphide—All laboratories agreed on all the *Br. suis* and *Br. melitensis* strains, on the basis of results obtained in the specified 4 day observation period. In all laboratories including Huddleson's 4 cultures of *Br. abortus* failed to produce hydrogen sulphide in 2 days or produced only a trace.

The data obtained in this study show that with reasonable care in technic excellent agreement between different laboratories can be obtained in these specific tests for differentiating the organisms of the Brucella group. The classification of the various strains was not as satisfactory but this was due chiefly to difficulty in the interpretation of the results of hydrogen sulphide formation. The *Br. suis* strains were classified best, the *Br. melitensis* strains next and the *Br. abortus* strains less satisfactorily. In view of the trouble encountered in the hydrogen sulphide test, it is recommended that the thionin and basic fuchsin media be used as a basis for classification and that the hydrogen sulphide test be regarded as of secondary importance.

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* Abstract of paper read before the Laboratory Section of the American Public Health Association at the Sixty-fourth Annual Meeting in Milwaukee, Wis., October 7, 1935.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

VENEREAL DISEASES

WE have called attention to the fact that among the six major objectives of Thomas Parran, M.D., Surgeon General of the U. S. Public Health Service, the control of syphilis is included.

It is needless to recite the difficulties in the way of control of venereal diseases in general. These have been recounted time and time again. In spite of many agencies devoted entirely or partly to the control of venereal diseases, there has been a constant increase in their incidence, certainly as far as the United States is concerned. There is perhaps no other single disease which plays so large a part in dealing injury to the population of our country as syphilis. Its effects are far reaching. The late Sir William Osler used to put it something like this—Venus and Bacchus are both hard masters; both demand payment, Bacchus promptly; Venus for practically the rest of one's life.

We believe that too many of the agencies interested in the control of venereal diseases have done preaching instead of practical work. Preaching will never get anywhere in the control of venereal diseases. Unfortunately perhaps, we do not at the present day see the pictures described by Astruc, in writing of the pandemic of the 15th century, so severe and far reaching as to be "one of the notable events in medical annals." "From the Pope of Rome on his throne to the lowest scullion in christendom, all were infected with syphilis" (Astruc). Syphilis is now mild compared to what it was at that time. Death is rare except in the very late stages. "Malignant types that are now curiosities were then the regular form of the disease and the mortality was enormous" (Osler). The worst forms of syphilis are seldom seen by general practitioners. A comparatively few years ago, before steam had controlled ocean traffic, one would encounter

practically untreated cases of syphilis on ships after long voyages, as from China to New York, but even in the experience of specialists in large cities, such cases are now comparatively rare. Doubtless if these were seen more often the medical profession in general would realize more keenly than it does the horrors of syphilis, and this would be reflected in the attitude of the average health officer.

A recent study[1] has brought out facts which should have wide circulation, not only among the profession, but also among people in general. In this study a 1 day census covering 49 representative counties in the United States, was made, and reports were received from 39,000 medical sources. It was shown that the prevalence rate for venereal diseases was 7.7 per 1,000 and that there are constantly under medical care for syphilis 4.3 and for gonorrhea 3.4 per 1,000. From the standpoint of control as well as of the patient himself, one of the worst features was shown to be that 71 per cent of those who had contracted syphilis did not apply for treatment until the infection had become late, and of those with gonorrhea 51 per cent did not apply until the disease had reached the chronic stage.

From the facts obtained, it is estimated that there are approximately 493,000 in this country constantly under treatment or observation for gonorrhea and 683,000 for syphilis, a venereal disease population of 1,176,000. Fresh infections per year are 4 per 1,000 for syphilis and 8 per 1,000 for gonorrhea, which justifies the estimate that there are each year 1,500,000 persons seeking treatment for early syphilis or gonorrhea. It is estimated that 7 out of every 100 individuals 40 years of age or over remain potential syphilitic problems as far as treatment goes. The highest attack rate for syphilis is in the early adult ages, 16 to 30 years. The trend for syphilis seems to be upward, with a possible 3.4 per cent increase in the rate per 1,000, but there is a decrease in the prevalence rate for early cases. This cannot be interpreted as evidence of progress in the control of the disease since it has been shown that many cases fail to seek treatment until the late stages and some remain untreated for life. The data concerning gonorrhea actually under treatment show that the number of cases has decreased, but there is evidence that this decrease reflects the neglect of treatment during the economic depression and not a decrease in the number of infections.

We believe that these figures demonstrate the wisdom of selecting syphilis as one of the major points of attack. If they do not tell the story clearly, argument cannot avail. We trust we are not unduly pessimistic in expressing doubts as to the immediate success of the movements against venereal disease proposed. Human nature has not changed greatly during many centuries. Venereal diseases have been with us since the dawn of history. We are entirely too much accustomed to them. Too many of our young men, for example, boast of having gonorrhea and regard it, if not as a matter or pride, as one showing that they know their way about and are men of the world.

Certainly, as far as this country goes at least, the right way of attacking the problem has not yet been demonstrated, in spite of the scientific knowledge we have concerning the diseases, methods of transmission, etc. We cannot frighten the average person about venereal diseases. Like the poor, we have them with us always and have become accustomed to them.

REFERENCE

1. U. S. Public Health Service, U. S. Treasury Department. *Venereal Disease Information*, 16, 5 (May), 1935.

ANNUAL MEETING OF THE WESTERN BRANCH

MANY things conspired to make Vancouver the health center of the American continent during the meeting of the Western Branch. It is Jubilee year of the city. It is hard to believe that where this beautiful city now stands with its fine buildings, its extensive parks, its health centers, hospitals, and so forth, there was, only 50 years ago, a forest of gigantic firs. Marvelous are the works of man!

The celebration of the Jubilee year began properly on July 1, but His Worship the Mayor of Vancouver issued a proclamation declaring a "Health Week," and granting to the public health organizations meeting there the privilege of introducing the Jubilee festivities. Five organizations met during the week:

Canadian Public Health Association (25th Annual Meeting)
Western Branch A.P.H.A. (7th Annual Meeting)
Conference of State and Provincial Health Authorities of North America (51st Annual Meeting)
Canadian Tuberculosis Association (36th Annual Meeting)
British Columbia Public Health Association (1st Annual Meeting)

Of somewhat more remote interest, as far as public health matters are concerned, is the fact that June 23, one of the days of the meetings, the King's birthday took place and was celebrated in the city. Apart from the very real affection and admiration which all have for the British King, the occasion was made use of to raise money through a dinner for the cancer funds of the Province.

Perhaps most important of all is the fact that the five organizations got together principally in honor of Dr. H. E. Young, dean of the public health profession in Canada, a man who is as well known and as much beloved in the United States as in Canada. His services have been extraordinary in times of plenty but especially so in times of distress. Apart from his personality and his accomplishments, he is none the less noted for the number of young men who have taken their training under him and their inspiration from him.

The first two days of the meetings were given up to the State and Provincial Health Authorities of North America, the Canadian Tuberculosis Association, and the British Columbia Public Health Association. On Wednesday, the third day, meetings of the Canadian Public Health Association and the Western Branch of the American Public Health Association were begun conjointly.

The attendance was good and the papers were exceptionally so. Of course, there was a tendency to consider chiefly those things in public health which concern the West and the Northwest, but, after all, while certain conditions prevail in one section more than another, public health is a unity and all its aspects are of interest to those who have the general cause at heart.

A particularly interesting feature of the meetings was the very graceful gesture of conferring honorary life membership in the Canadian Public Health Association on Dr. Walter H. Brown, President of the American Public Health Association, and Dr. A. J. Chesley, Executive Secretary of the Conference of State and Provincial Health Authorities of North America. Dr. John W. S. McCullough, Toronto, and E. S. MacPhail, of Ottawa, were similarly honored.

The scientific exhibits were especially notable. The commercial exhibits were not extensive, but excellent, and it is particularly interesting to note that the firms supplying these exhibits were keenly interested in public health and the success of these meetings. In fact we have been told repeatedly that they made possible many of the arrangements for the meetings.

Abundant provision was made for the ladies, more abundant and perhaps more entertaining than for the men, probably because the ladies had nothing else to do, while the men were expected to work. However, the men were taken to see the water works of Greater Vancouver, a remarkably fine plant from mountain streams, with the watershed thoroughly protected and policed.

The meeting was notable as being the first joint meeting of the Canadian and American Public Health Associations, an example which we might do well to follow from time to time in the future. Some of the members of the Canadian association stated that the stronger the Canadian association becomes, the stronger will be their admiration and adherence to the parent Association in the States.

The meeting of the Western Branch was brought to a close on Friday evening, when the annual banquet was held, at which the new officers were installed, headed by Dr. H. E. Young as president. The new officers are as follows:

President—H. E. Young, M.D., Victoria, B. C.
President-Elect—Platt W. Covington, M.D., Salt Lake City, Utah
Vice-President—F. D. Stricker, M.D., Portland, Ore.
Vice-President—F. E. Trotter, M.D., Honolulu, Hawaii
Vice-President—J. Rosslyn Earp, Dr.P.H., Santa Fe, N. M.
Secretary—W. P. Shepard, M.D., San Francisco, Calif.
Treasurer—W. F. Higby, San Francisco, Calif.

The banquet was marked by two special features: the granting of an honorary life membership to Dr. Arthur J. McCormack and the presentation to the Western Branch by Dr. Young of a gavel, made of wood taken from the "Beaver," a vessel closely connected with the development of the West and the Northwest.

The members left for Victoria, some at midnight and some on Saturday morning. They were met at the dock by the health authorities of the Province and City. Citizens had provided cars in which the visitors were taken for beautiful drives through the city and about the island, including the wonderful Burchart Gardens.

Too much cannot be said of the hospitality shown by the citizens of Victoria and by the Provincial and City health authorities.

The weather was perfect—a trifle warm but not as warm as the reception which was given to delegates. The whole city conspired to make us welcome. Everything was done for our comfort, and for those who were privileged to attend there will remain for many years the most pleasant and grateful memories of the hospitality shown.

The 1937 meeting place of the Western Branch will be Phoenix, Ariz.

NOISE

DURING the past few decades infectious diseases have been better understood, and controlled to a considerable extent. The incidence of such diseases as tuberculosis, diphtheria, and typhoid fever has declined markedly. Drinking water has been purified. Sewage disposal is carried out in a decidedly more sanitary way than in earlier days. Streets are being kept cleaner. Dwellings, though universally not yet what they should be, are more sanitary. Coincident with these notable achievements from a public health standpoint there has crept into our lives a new

public health problem—noise. This has come about largely as the result of the extensive mechanization of our daily life by such devices as the automobile and radio.

Noise is unwanted auditory stimulation. Thus it may be seen that otherwise beautiful music may be noise. Unlike garbage or street dirt, noise has the peculiar property of radiating instantaneously in every direction from its source to annoy every one within the zone of its penetration.

Loudness is one of the most distressing attributes of noise. Its intensity may be measured in units, called decibels, by which the noise of a busy city street corner can be accurately compared with that of an automobile horn, the roar of a jungle animal, the loud speaker of a neighbor's radio, or the boisterous cocktail party in the wee hours of the morning in an otherwise quiet suburb. Although fatalities have seldom (if ever) been reported from noise directly, the eardrums of heavy artillerymen may be burst, and it is a well known fact that boilermakers become deaf.

Another aspect of noise that is annoying, to say the least, is the ambiguity of its direction. To puzzle about the source and the unfamiliarity of sounds that are distracting often prevents one from devoting his attention to more important things. Intellectual workers are more affected by noise than others. Nevertheless, some experiments with industrial workers indicate that noise prevention in factories tends to increase the quality and quantity of output and the workers have quite generally voiced greater satisfaction with quieter conditions and felt lessened fatigue.

Watson has demonstrated that noise is an elemental fear-producing stimulus. It is one of two things that will frighten a baby that has lived in a protected environment and has never experienced fear. From a physiological standpoint noises tend to increase muscular tension and thus the energies of many people are insidiously dissipated without their awareness. Although unawakened by noises at night, their effect on muscle tension deprives persons of adequate recuperation during sleep hours and unfits them for the ordeals of another day. The persistent accumulation of such effects may be tolerated by some people better than by others, but it is safe to say that millions are stimulated and harassed when they should rest properly to promote well-being.

There is little doubt that the people of the United States are among the noisiest. Much of it is unnecessary. New York City has done much recently to lessen its noise. Many cities, including London, Rome, and Paris, within the last year or two have completely controlled the automobile horn by ordinance. Despite belief to the contrary, there was a reduction in automobile accidents in these cities after these ordinances went into effect—a fine demonstration that drivers could use their heads instead of their horns.

In some countries for many years anti-noise societies have been organized to arouse the public consciousness to the importance of noise prevention. The responsibility of manufacturers and merchants in these matters is clear. Quiet automobiles, street cars, radios, home devices, will be in demand to replace the noisy ones. Individuals have a great responsibility. The time should not be far distant when it may be as much a breach of good manners and public health to to emit an unnecessary noise as it is to expectorate on the sidewalk. When the public gets sufficiently conscious of the need for preventing unnecessary noise, ordinances may not only be passed, but enforced, to protect every one. Hospital zones are now protected by law. If such measures are good for the ill, they

will undoubtedly help to keep many not acutely ill from being uneasy or dis-eased. With noise on the increase, cities must be planned in the future to protect their citizens. The proper construction of dwellings, the arrangement of streets and parks, with sound-absorbing trees, shrubs and vines, and quiet, efficient transportation systems leading to decentralization of overpopulated regions, hold possibilities as yet but little realized.

This problem, so essential to coöperative living, should be a challenge to education. Children should be taught noise prevention as well as cube root. There was a time when we were ignorant of and indifferent to the consequences of polluted water supplies. This is now interesting history. There will be a time when society will look back and say, "How could they exist with such a jumble of barbaric noises to harass the equanimity of man!"

INTESTINAL ANTHRAX

THE older literature carries accounts of a number of serious outbreaks of intestinal anthrax due to infected food. Such reports are now so extremely rare that they deserve mention in order to keep physicians and health officers on their guard, especially as the diagnosis is not easy to make and is only positive after laboratory examinations.

The outbreak in question [1] occurred in September, 1934, in a Rumanian regiment stationed on the western shore of the Black Sea. It was confined to private soldiers, 14.5 per cent of whom were attacked with severe gastrointestinal symptoms, muscular weakness and chills, with a case fatality rate of 30 per cent. Autopsy revealed an extensive enteritis with hemorrhages in the lower part of the ileum. The diagnosis was confirmed by the findings of the laboratory at Bucharest. Several diagnoses were made—food poisoning, paratyphoid B, and even cholera being suspected. The infection was traced to food eaten by the troops in transit between Jassy and Constantza.

REFERENCE

1. An Outbreak of Intestinal Anthrax. *Rev. Igiena Sociala.* Bucharest. 5:690–698, 1935. French Summary (Reviewed in *Bull. Hyg.*, Apr., 1936, pp. 302–303).

In September Journal

PUBLIC HEALTH EDUCATION*

"Death In Safety Week"—Under this title, Dr. N. L. Burnette of Ottawa, and in an editorial headed "The Accident Problem: An Opportunity and a Responsibility," automobile accidents are presented as a public health problem.

Dr. Burnette says:

> Might it not be that in the major causes of accidents we are dealing unknowingly with a certain proportion of medical, neurological, and psychiatric cases? It would seem worth while to explore this possibility. Certainly we will never touch these cases through our present methods of initial driving instruction and licensing, nor will we ever correct their faulty driving habits through exhortations to be careful.

The editorial further emphasizes the actual ignorance of health and control authorities as to the real nature of the problem.

> The derivation of the word accident indicates that it was formerly employed to denote an event unpreventable and unforseen, or due to chance. This conception is still widely held in the public mind, but the sooner the conception of accident as a chance or unfortunate event, the result of "bad luck," etc., is discarded, the better. Scientific evidence has shown that many accidents have an explanation in physiological and psychological defects or maladjustments and inadequacies of the persons involved. Once the relative importance and the character of the various causes of accidents are determined, the solution would become clear and there is no doubt that "the human factor" is one to which increasing attention must be paid
>
> As a result of our ignorance in regard to the underlying factors involved in accidents, the methods of prevention and control which have been employed have lacked any semblance of the scientific approach which is so necessary to success.

The "conclusions" of Dr. Burnette:

> 1. Death and injuries from automobile accidents have reached a volume where the public health field must be concerned about them.
> 2. In many major causes of accidents, the reasons advanced are purely guesses.
> 3. Safety education cannot be successful until its teaching is based on the proper application of tested methods designed to correct conditions for which the cause has been established.
> 4. Public health organization could bring into the field of safety education a viewpoint at present lacking because public health is based on preventive medicine and the traditional attitude of preventive medicine is experimentally to establish causes and test methods of control before embarking upon propaganda.
> 5. In public health work, there is already a well established precedent for combining medical knowledge with engineering and pedagogical psychology.
> 6. Public health should interest itself in traffic accidents, to the end that, with the exception of such matters as highway construction, law enforcement, and certain factors in motor engineering, the public will eventually look to the public health field for the explanation of important problems, as well as leadership in plans for their solution.

The reasoning of the writers sets up a fresh objective for health education in automobile safety. The long range job is to lead public health and other authorities to a new viewpoint and a new line of attack.

Editors of bulletins or house organs will wish to quote liberally from the full text of the article and the editorial.

In *Canadian Public Health Journal,* 105 Bond St., Toronto 2, Ontario. June, 1936. *35 cents.*

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* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

To Health Educators Everywhere—To you is addressed this message from Dr. W. W. Bauer, Chairman, Public Health Education Section:

The American Public Health Association, Public Health Education Section, wants to be of the greatest possible service to everyone interested in health education. One of the best ways to accomplish such a purpose is to exchange ideas. There is no one who has a monopoly on originality. Not all the good ideas come from persons whose names are well known, nor do they all originate in the big and well financed health education agencies. The lone worker in public health such as the nurse in a distant county may contribute an idea which is fresher and more original than the most elaborately conceived plans of the health educator in a national agency.

Health education is basically the same in all countries because human beings are basically alike. Differences in language and customs are superficial. The peoples of all lands respond to the same basic appeals.

All this merely leads up to what I wish to say in support of the paragraph "To Our Readers In All Lands" which appeared in this department last month. As the meeting of the American Public Health Association at New Orleans approaches, we are particularly eager to hear from readers of this department in foreign countries. If you cannot be present, will you not send your materials to the Clinic Session of the Public Health Education Section at which they will be discussed. We would like you to send posters, pamphlets, film strips, motion pictures, and exhibits. If the material itself is too bulky, send photographs and descriptions. Be sure to tell how it was made, what it cost for equipment, what it costs to keep in operation, and what responses it has brought. Of especial interest are devices which show originality and which have been developed without the expenditure of unusually large sums of money.

Syphilis Campaigns Desirable—Active effort throughout the year, plus short term intensive campaigns are desirable against syphilis, according to Savel Zimand writing in *Better Times*, Welfare Council, 122 E. 22d St., New York, N. Y. June, 1936. *35 cents.*

The "taboos" associated with this subject can be overcome and the campaign approach is especially useful for this purpose.

The aims of the syphilis campaign should be two-fold: to familiarize the people with the essential facts concerning the disease and to induce as many persons as possible, suffering from syphilis, to seek advice and treatment. At every turn of the campaign difficulties of approach will be encountered, but these can be overcome by tactful methods. . . .

The instruments popularly used for conducting mass health educational work are varied, but whatever their nature, there are certain fundamental conditions without which they cannot accomplish their purpose. These are: scientific accuracy, emotional appeal, concreteness, and simplicity.

A "campaign" may be city-wide or limited to a certain district. In either case, the active support of the medical profession, nurses, social workers, religious leaders, head of industries, etc., should be obtained. The organized health center districts of the health department continuously receive generous assistance from the medical advisory and general advisory committees of the centers.

In addition to this active participation from organized groups, it will prove useful to secure the support of a group of outstanding citizens residing in the district. Such volunteer committees may well include among others a considerable representation of leading conservative elements of the community.

The outstanding clergyman of the district, the respected chairman of the local women's club, the outstanding civic, physician, or business leader, presiding at a meeting for dissemination of facts on syphilis, will do a great deal to bring general community approval of this work. It will often add to the effectiveness of lectures or meetings if they are conducted in church houses or at women's clubs. . . .

The "campaign" approach in itself is not

sufficient. The campaign should be supplemented by personal instruction of individuals through private physicians, health department staffs, nurses, social workers, and teachers, all of whom can and are influencing the conduct of the public. We should try to determine the nature and extent of any objections to the discussion of these diseases, so that, as far as possible, they may be overcome. To this end it is well that the enlightened men and women of the community understand and accept the new orientation on venereal diseases. They will help to destroy the false taboos created about these diseases.

New Orleans in October, 1936—At the Annual Meeting of A.P.H.A. the Public Health Education Section will provide a series of programs for those concerned with adult health education, together with recognition of the specialized interests of those engaged in child health education.

Many other programs will supply useful material and mental stimulus for both adult and child health educators.

As usual, the "lobby sessions" will bring the personal contacts and exchange of experiences which are so valuable to alert public health workers.

If present plans are realized a health education headquarters and display will be maintained. *It is hoped to give special attention to personal conferences.* Delegates are invited to plan in advance outlines of their problems and the kinds of information they would like to gather at New Orleans. They are requested to come well prepared to talk over the details of their local or state health education programs.

A portfolio of specimens, with generous explanatory notations, would be appreciated by many of the visitors.

"Mass Education On Marriage"—How to reach numbers of young people is discussed under the above title in *Journal of Social Hygiene,* 50 W. 50th St., New York, N. Y. March, 1936. *35 cents.*

Marriage education experts such as Professor Maurice A. Bigelow and Paul Popenoe believe that the thing to do is to "begin where they are." In other words, to provide educational information at the point and from the sources through which this large group receives most of its knowledge. Among these sources the newspapers are chief, and Professor Bigelow and Mr. Popenoe have experimented during the past year with a number of feature articles, prepared in popular style by special writers. Such titles as "By All Means," "Let 'Em Marry Young," "How to Make Love to Your Wife," and "Do College Girls Make the Worst Wives?" vie with feature story headlines on other topics, and wide circulation is assured by release through press services such as the King Features Syndicate and the *Every Week Magazine,* which serve hundreds of newspapers. Even the dignified *New York Times Magazine* recently published an original article by Mr. Popenoe entitled "Is There a Scarcity of Good Husbands?" Under these attention-getting titles the authors of course set forth solid, accurate educational facts, and the many inquiries and comments received prove the effectiveness of this method of education.

Newspaper fiction also may be effective, as witness the short story, "No Right to Marry," by Margaret Culkin Banning, reprinted in this number of the Journal from the *New York Herald-Tribune's* Sunday magazine, *This Week.*

The monthly magazine, another source of popular information, are open channels for marriage education. Such articles as "Marriage a la Campus," by Florence Haxton Britten, in November, 1935, *Red Book,* which summarized the opinions of a dozen or so college deans on the pros and cons of marriage during student days, and the articles "Can't I Save My Marriage?" and "Repeat Course in Matrimony," in *Good Housekeeping,** discussing divorce prevention, are real marriage education placed where it will do the most good.

The radio, too, which reaches this same group of "normal young people" offers great opportunity for marriage education, but so far this opportunity has not been fully realized. Many single talks, and short series of talks, on marriage and family problems have been given by various speakers, but it yet remains for some leader in this educational field to build up a day-to-day program and the large popular following

* See issues for January, 1935, and February, 1936.

among young people which such a program deserves. Neither have the possibilities for dramatizing such material over the air been utilized, to the extent that they offer.

One more great medium of education, for young and old, should be more fully employed for constructive efforts. When the motion picture screen and its talking accompaniment really sets about showing young people normal, wholesome marriage and family life with the same thoroughness with which the seamy side of these relations has in the past often been exploited, progress in mass education on marriage will really occur. Recent films show promise in this respect. Let us hope for further encouraging developments.

Learning the Language and Understanding It—When we interpret health work to the community, or seek to influence the health habits of adults and young people we face a wide range of technics from which to select our weapons.

Not many of us will have the time to become thoroughly at home with printing, photography, optical projection, broadcasting, etc. But we do need to know our way about, and to talk intelligently with those who are specialists in one or the other of the technics we may wish to utilize.

A similar situation faces many men in commercial advertising. What to do about it is illustrated by suggestions to advertising people who need to learn more about photography and the reproduction of photographs. The answer is entitled "Camera!" by R. Hertzberg.

A superficial acquaintance with cameras and dark rooms, gained from occasional visits to studios and engraving shops, proves embarrassingly inadequate when you are called upon to discuss . . . with the production people at the plants. Needless to say, such ignorance leads to unnecessary grief and expense.

The simplest, cheapest, and most pleasurable way to acquire an understanding of photography is to become a photographer yourself—on a small scale, of course. If you don't already own a camera . . . buy an inexpensive one that will take pictures at least "vest pocket" size ($1\frac{5}{8} \times 2\frac{1}{4}$ inches), or larger. Also buy a developing and printing kit, which includes everything you need for the actual production of photographs. You can spend as little as five dollars for the whole outfit, camera and all.

The bathroom at home, with the shade drawn and a breadboard across the hand basin for a work table, makes a perfectly good darkroom. Shoot a roll of film of the wife and kids in bright sunshine, read the instruction book, and go to it. You'll get a tremendous kick watching the images come up on the negative, and you'll get another thrill when you make the positives, or contact prints.

After an hour's dabbling, you'll have a clear picture (no pun intended!) of how a negative, made by a camera from a . . . is "printed" photographically on sensitized zinc to make a planographic printing plate for the offset press; and how a similar negative . . .

Of course, other manipulations are involved. For instance, . . . These other operations become mere details once you see for yourself how a negative is made from a piece of copy (which is a positive) and how other positives can be made from negatives and more negatives from these positives and progressively without end.

The next step is to learn how enlargements and reductions are made from either negatives or positives, usually the former. The popular Eastman Kodak book "How to Make Good Pictures," will give you a general idea; a visit to your photographer's studio will make the mechanical-optical processes clear. From then on, planographic and intaglio printing will hold no terrors for you.

If you are naturally lazy or lack experimental inclinations, make a date to spend several hours, or half a day, at your photographer's place, and at least observe how he works. However, prepare yourself by reading the early chapters of the aforementioned book, so that you won't have to ask silly questions. Your picture man will be glad to give you darkroom demonstrations, because a better understanding of photography on your part will simplify his job to a large extent.

Of course, a visit to the offset or roto house that does your work will also be of educational value. If you display any knowledge at all of photography, you'll find that the men will be anxious to explain every detail and will take the time to do so. The visitor who knows nothing about photography is rushed through with a lot of

mumbled explanations. He is merely impressed by the dazzling lights, the smelly *darkrooms, the air-conditioned retouching* rooms and the noisy pressroom, and he leaves more confused than edified.

In *PM*, 325 W. 37th St., New York, N. Y. June, 1936.

A series of first hand contacts might be worked out in a city, or even a state where a group of interested people could come together for the purpose. Some one must do some wise planning in advance.

"For Sale by Superintendent of Documents"—Written by, published by, and for sale by, are usually functions of three different arms of the federal government. This simple fact seems unknown to many makers of reading lists, and editors of bulletins and other periodicals.

Elsewhere we mention a pamphlet, "What Every Teacher Should Know," etc. This was written by the U. S. Office of Education (through a staff member). It is published, or rather printed, by U. S. Government Printing Office; but it is "For sale by the Superintendent of Documents, Washington, D. C."

The simpler reference is the clearer, and takes less space. Readers usually wish to know not alone the name of the author, but also the sponsoring agency of the government. Beyond those facts, mention only "Superintendent of Documents, Washington, D. C.," and the price. To add "U. S. Government Printing Office" adds no more information of value than to mention the name of the printer of your annual report, or your new folder on measles. And it does cumber the page to add words without significance.

When an order is sent direct to the sponsoring part of the government the filling of the order must be delayed until the letter and the cash sent to the Office of Education (or whatever it may be) has been forwarded to the Superintendent of Documents.

Certain publications, carrying a price and "for sale by the Superintendent of Documents," will be supplied free if the sponsoring government agency is asked for a single copy. But this fact need not be allowed to confuse the printed reference.

Taboo Words—We need a taboo list, a black list of words not to be used in public health education. Some words are easily misunderstood. Other words are dull and heavy. Yet others are inaccurate, at least as they are commonly used. In the third class are words discussed in *Bulletin*, National Tuberculosis Association, 50 West 50th St., New York, N. Y., issue for July, 1936:

One of them is our old friend "tubercular" as a substitute for "tuberculous." The adjective "tubercular" (it can never be used correctly as a noun), means a nodular formation in the tissues of the body that is produced by something other than the tubercle bacillus. Any process caused by the tubercle bacillus is a "tuberculous," not a "tubercular" process.

Recently a newspaper in California wrote about a "tubercular test in a preventive campaign." Certainly the use of the term "tubercular" to describe a tuberculin test is about as wrong as wrong can be.

Another of these tabooed words is "preventative." Once in a while there is use for the noun "preventative" though usually the shorter word "preventive" is quite as good if not better. There is no use for the word "preventative" as an adjective; it is distinctly out of place used thus.

Hygeia, July, 1936—Material to use or to adapt:

Noise . . . Quacks and quackery . . . The tetanus bacillus . . . Cataract: its facts and fallacies . . . Tomorrow's drivers (safety education) . . . Cancer education: fight cancer with education . . . The care of the skin . . . How to follow the doctor's orders . . . The Martin family vacation (episodes V, VI, and VII) . . . The preschool child who misbehaves . . . The language of the heart

(electrocardiograph) . . . The gases of the air in medicine . . . Walking revelations (walking posture and its correction; see illustration) . . . Curious stories about health (a series) . . . A visit to Jenner's home . . . Everything in its proper place—even dogs . . . How diseases came with the white man (a series) . . . The ductless glands: the foremen of the body . . . Ivan Petrovich Pavlov: the Darwin of physiology (died in Moscow, February 27) . . . New books on health . . . Questions and answers.

In "School and Health":

Can the teacher help children to bear their physical defects and peculiarities? . . . A new health education course for a high school (Amherst, Mass.) . . . A high school class gets things done (Camden, N. J.) . . . A lesson plan on teaching safety in the third grade (Abcata, Calif.) . . . A challenging problem in health and home economics (Norristown, Pa.) . . . New health books for teachers and pupils.

A copy free to a health worker or health teacher. Write to 535 N. Dearborn St., Chicago, Ill.

The "Martins," the Bauers, and Others—Here is more from the Bauers about their creation, the "Martin" family. Says Dr. Bauer:

I am not sure whether my good friend, Evart Routzahn was trying to start an argument when he asked "Why Memorize a Broadcast?" What Mrs. Bauer and I had in mind when we wrote that introduction and suggested the use of the Martin Family Vacation episodes in a darkened room with a radio in the spotlight was that it would be necessary to memorize broadcasts because of the absence of sufficient light to read the scripts. At the same time, we are grateful for the suggestion that the whole broadcasting process be reproduced in the bright light of publicity.

With respect to the further question about granting permission to produce material provided no admission charge is made, we amplify our attitude as follows: It was our purpose to grant, without further correspondence, the right to produce these plays by genuine health agencies. Such agencies customarily do not make an admission charge. It was not our purpose to grant permission to those who might wish to use this material in order to make money for purposes which might not be in accord with the objectives of public health. It is quite true, as suggested, that possibly we are, as health educators, giving away too much. Neither *Hygeia* nor the authors will raise any objections to having admission charged providing we are informed in advance as to who is going to charge admission and for what purposes. Success in getting a paid audience for health education material would, indeed, as suggested by Mr. Routzahn, "be a real achievement, and a distinct advance in getting attention for health messages."

Health Education for Pan America—The recent meeting in Washington of Pan American Conference of National Directors of Health gave quite a little attention to health education and to activities which call for phases of health education. Resolutions covered recommendations as follows:

Campaigns for the prevention of industrial accidents, etc., etc.
Extension of free maternity centers
Special education of women in hygiene and public health
Popularization of the newer knowledge of nutrition
Campaigns of education against drug addiction
Education of mothers in the prevention of trachoma

The above is reported in *Bulletin*, Pan American Union, Washington, D. C. June, 1936. *15 cents.*

HEALTH EDUCATION

The following references, not reaching the editor, are reported in *Library Index*, National Health Council, 50 W. 50th St., New York, N. Y.:

Report of committee on physical education. British Medical Association. *British Medical Journal*, Supplement (London), April 18, 1936, p. 149–88.

Motion pictures for health; Buffalo's experience in using this method of education, R. W. Osborn. *Bulletin* of the National Tuberculosis Association (New York City), 22:37–38 (Mar.), 1936.

A need in rural health education, J. T. Anderson. *Journal of Health and Physical Education* (Ann Arbor, Mich.), 7:140–41, 208 (Mar.), 1936.

Community health program, E. W. Morris, D.D.S. *Journal of the American Dental Association* (Chicago), 23:495–501 (Mar.), 1936.

MAGAZINE ARTICLES

"Blood Will Tell," by M. H. Irwin (recent findings as to different types of anemia); "The Family Takes a Vacation," by S. J. Crumbine, M.D.; "Alcohol and Modern Life," by W. A. McAndrew. *National Parent-Teacher Magazine,* 1201 16th St., N.W., Washington, D. C. July, 1936. *15 cents.*

"Don't Catch Cold," by H. M. Reed. *Collier's.* Jan. 4, 1936. "Read these easy-to-take instructions for preventing that cold you may get or for routing the one you had before you read this."

"Educating the Young Driver," by A. W. Whitney; "Tommy Will Not Go to Sleep," by S. J. Crumbine; "Solid Foods for Sound Babies," by M. H. Irwin. *National Parent-Teacher Magazine,* 1201 16th St., N.W., Washington, D. C. April, 1936. *15 cents.*

"Fake Accidents, Inc.," by P. W. Kearney. *Saturday Evening Post.* April 11, 1936. A side-light on a phase of "safety" controls.

"Fools on Wheels." Editorial, *Collier's.* Feb. 8, 1936:

> Suppose the railroads or the steamship companies or any other group of corporations killed 36,000 people and injured 864,000 in a single year. Suppose, also, that the chief cause of all this death and injury was plain human carelessness. Can you imagine the political passion which would be aroused against the guilty? Can you picture the denunciations and the oratory and the general fury?

"Man of Brains," by G. E. Pendray. *Today,* 152 W. 42d St., New York, N. Y. June 27, 1936. *15 cents.* Sketch of Dr. Harvey W. Cushing.

"The Next Great Plague to Go," by Thomas Parran, M.D. *Survey Graphic,* 112 E. 19th St., New York, N. Y. July, 1936. *30 cents.* "With the courage and authority characteristic of his years of leadership in public health, Dr. Parran tells how syphilis can be uprooted." 9 pages; numerous "pictographs" which bulletin editors will wish to reproduce (ask *Survey Graphic* for permission).

"School Health in Hawaii," by T. R. Rhea. *Journal,* N.E.A., 1201 16th St., N.W., Washington, D. C. April, 1936. *25 cents.* With picture from Palama Settlement.

IN HEALTH BULLETINS

A Conference on Mental Health in Education is reported in *Monthly Bulletin,* Massachusetts Society for Mental Hygiene, 3 Joy St., Boston, Mass. Jan.-Feb., 1936.

"Social Hygiene Education for the General Public," by H. I. D. McGillicuddy. *Bulletin,* Massachusetts Society for Social Hygiene, 1145 Little Bldg., Boston, Mass. March, 1936. The need and the opportunity.

"Cut Prices in Health" in *Birmingham's Health,* Birmingham, Ala., discusses the decreased local appropriations for public health services as compared with appropriations for other public services.

Diagnostigrams is mimeographed, one or two pages on a pleasing legal cap sheet, for promoting the Early Diagnosis Campaign in New Jersey. The single line headings at the left, underlined, help to make easy reading the news of the state tuberculosis activities. Every issue is accompanied by several sheets of ready made press copy with blanks for easy localization. New Jersey Tuberculosis League, 15 E. Kinney St., Newark, N. J.

Some of the perils of vacation are presented in July, 1936, *Red Cross Courier,* Washington, D. C. The *Courier* has been dressed up, inside and out including new headings, descriptive and attention getting, which may have been suggested by the recently adopted heading style of *Literary Digest.*

BOOKS AND REPORTS

Veterinary Military History of the United States, with a Brief Record of Veterinary Education, Practice, Organization and Legislation—*2 Vol. By Louis A. Merillat, Lt. Col., Vet. Res., Chief Veterinary, American Expeditionary Forces, and Delvin M. Campbell, Lt. Col., Vet. Res., Editor, Veterinary Medicine, sponsored by the American Veterinary Medical Association. Chicago: Veterinary Magazine Corporation,* 1935. 1,173 pp. Price, $10.00.

The authors state that chapters I to IX are, in fact, the preface of this history, since the ground covered is too complex and extensive to be introduced in a few words. The authors say:

> We have undertaken for the first time not only the writing of an American veterinary history but also cultivating a taste for its details. . . . This book is the outgrowth of a series of articles published in 1932 on "The Veterinary Service of the American Expeditionary Forces" on the Western Front of the World War which were intended for publication in book form. . . . With these data as the inspiration it was decided to expand the manuscript so as to include the entire history of the military-veterinary service of the United States from the Revolutionary War to the present time, and to include a list of the World War veterinary officers, their ranks, promotions and assignments, and finally of all who had served in our army since 1879 when, by act of the Congress, graduation from a recognized veterinary college was made a prerequisite to such service.

Perusal of these volumes enables one to discern that the World War was not only the inspiration for the book but the explanation of why in the title they have used the word "military." If cognizance of these facts were not taken one might be inclined to criticise the title.

The authors have done a splendid work in compiling the history of our veterinary existence in the United States and have produced one of the most valuable contributions to veterinary science as a whole that have ever been made, for which they are to be congratulated.

This veterinary history will be of interest to the medical profession for two reasons: (1) that veterinary medicine and human medicine are allied subjects; (2) that at present the veterinary corps of the United States Army is under the direction of the Surgeon General, and so veterinarians, medical men, and others will find much of interest in this history.

The authors said in their preface that they were not only writing an American veterinary history but also cultivating a taste for its details. This is an actual fact. The reviewer has found the reading of these volumes intensely interesting, and would recommend them to all who desire to know the detailed facts not only of American veterinary history but of the experiences and functions of the veterinary corps during the World War.

It is regrettable that the authors in their prejudices against agricultural colleges and experiment stations have failed to include in this history the valuable contributions of these organizations the personnel of which have contributed unceasingly to the advancement of veterinary science in the United States.

The book is abundantly illustrated, mostly with reproductions of photo-

graphs. The veterinarians of the country in general and especially those who served during the World War, will recognize many of their old friends and comrades, and this holds true for the medical men who served with them.

A. J. DURANT

The Medicine-Man of the American Indian and His Cultural Background—*By William Thomas Corlett, M.D., L.R.C.P. Springfield, Ill.: Thomas,* 1936. 369 pp. Price, $5.00.

This is an unusual and an extremely interesting book. As the author says, it is not a medical book and contains "as much religion as medicine, and more theology than pathology." However, it tells us of the medicine-man of the American Indians and gives an insight into their way of thinking and their primitive methods in surgery as well as medicine. There has been among all peoples an ingrained longing for those who were able to mitigate pain and to preserve life, and all peoples have had physicians and priests, often combined in one person.

Among the Indians it has been impossible to separate the religious beliefs and rites from the practice of the healing art, and this accounts for the sacerdotal atmosphere found here and there throughout the book. Even in the witchcraft which was found among these aborigines, and in spite of its attendant enormities, we find useful elements, and in many ways the medicine-men were useful to the people and were held in high esteem.

In Part I we find a discussion of the racial origin of the American Indian and the peopling of the New World, the author concluding that the American Indian belongs to the Mangoloid division of the human race and that he came from Asia via the Bering Strait to the New World between 8,000 and 20,000 years ago.

In this Part also are treated the diseases of Indians, their religion, and their medicine-men. Following this, the various sections of the country beginning with the Arctic region and ending with Patagonia, are considered. The book shows a great amount of study and is amply documented.

The author frequently quotes Dr. Roy Lee Moodie, whose work on paleopathology is so well known, and credits him with giving advice and assistance in reading the manuscript as well as for lending photographs and other illustrations of objects of prehistoric as well as later periods. He points out that accounts of the aborigines have dwelt too much on their savagery and barbarism and not enough on their good qualities. What has ever been written finer than the speech of Nezahualcoyotl to his nobles, ending with this beautiful paragraph:

> The great, the wise, the valiant, the beautiful—alas! where are they now? They are all mingled with the clod; and that which has befallen them shall happen to us, and to those that come after us. Yet let us take courage, illustrious nobles and chieftains, true friends and loyal subjects, let us aspire to that heaven where all is eternal and corruption cannot come. The horrors of the tomb are but the cradle of the Sun, and the dark shadows of death are made brilliant by the light of the stars.

We cannot but feel sad that some of these splendid tribes have disappeared, that many of those remaining have become degraded through contact with the white man, and perhaps all of them are on the way to extinction.

The book is beautifully printed and profusely illustrated. Specimens showing operations such as trephining and even double trephining, dressings of head injuries, cupping for pneumonia, etc., are given. An excellent index completes the volume, which can be recommended on account of its historical as well as its scientific and social interests.

MAZŸCK P. RAVENEL

The Specificity of Serological Reactions—*By Karl Landsteiner, M.D. Springfield, Ill.: Thomas,* 1936. 178 pp. Price, $4.00.

This work is a critical review of both the old and new literature pertaining to serological specificity, with particular reference to the chemical aspects of specificity. It is a revision and extension of an earlier German edition by the author. It includes a discussion of the serological specificity of natural antigens and antibodies, including proteins and cellular antigens, of artificial conjugated antigens and reactions with chemical substances of known constitution, and a consideration of chemical investigations of specific cell substances, including carbohydrates and lipoids.

The author has included material sufficiently elementary to orientate the inexperienced worker in this field, and at the same time has included material of such complexity as to make the work invaluable to workers more familiar with this type of study. The bibliography accompanying each chapter is particularly valuable. The volume is unusually free from typographical or other errors. It is well printed on non-glazed paper. The name of the author assures us of the authenticity of the material. NEWELL R. ZIEGLER

Food, Health and Income: Report on a Survey of Adequacy of Diet in Relation to Income—*By John Boyd Orr. New York: Macmillan,* 1936. 72 pp. Price, $1.00.

It seems to be a well established principle of economics that more adequate nutrition and resultant better health are found in persons in the higher income groups than in those in the lower groups. This is confirmed by the noteworthy study conducted by Dr. Orr for the Rowett Institute, reported in this well printed monograph.

In order to determine the adequacy of the diets of the people of Great Britain, they were divided into 6 groups according to income, and the average diets of each were compared with the optimal requirements for nutrition, as suggested by Stiebeling of the U. S. Department of Agriculture.

The average diet of the poorest group, comprising some 4½ million people, was found to be deficient in every essential constituent, whereas in the highest income groups there was complete adequacy and even a surplus of all food constituents. Thus, in the poorest group, the consumption of milk was only 1.8 pints per head per week, but in the wealthiest group it was 5.5 pints. The wealthiest group spent about twice as much for eggs and fruits as the poorest group, but the consumption of bread and potatoes was practically uniform in all groups. To make the diet of the poorer groups adequate would involve an increase of from 12 to 25 per cent in their expenditures for milk, eggs, butter, fruit, vegetables, and meat.

"A review of the state of health of the people of the different groups," concludes the author, "suggests that, as income increases, disease and death rate decrease, children grow more quickly, adult stature is greater, and general health and physique improve."

The practical application of the newer knowledge of nutrition is a social problem demanding economic statesmanship, not only in Great Britain, but in the United States. This interesting report should be helpful in drawing attention to this world-wide problem. JAMES A. TOBEY

"Do's and Don'ts for Health, Happiness and Abundant Life"—*By John J. Sutter, M.D. Bluffton, Ohio: Bluffton News Printing and Publishing Co.,* 1935. 151 pp. Price, $1.00.

A compendium of short statements covering human habits and ailments

ranging from athlete's foot to "tantrums and tears."

Its chapters deal with brief essentials of health and happiness, prevention of diseases, accidents and hazards, nutritional diseases, and "essentials" for infants, children, and adults.

This is a unique presentation of the menaces to health, happiness and life, and the means of their avoidance.

CHARLES H. KEENE

The Diagnosis and Treatment of Pulmonary Tuberculosis—*By John B. Hawes, 2nd, M.D., and Moses J. Stone, M.D. Philadelphia: Lea & Febiger*, 1936. 215 pp. Price, $2.75.

Unique in its field, this small volume furnishes for practitioners, social workers, nurses, and students a brief, concise, and yet fairly complete summary of the present-day knowledge of the diagnosis and treatment of pulmonary tuberculosis. From more than a quarter of a century in the practice of medicine the authors have drawn vividly on their vast experience and have made a valuable contribution to the literature on tuberculosis.

A foreword by Dr. Richard C. Cabot sums up admirably the chief characteristics of the book, *viz.*, "the firm hold on essentials and its corresponding elimination of 'frills.' I recognize and admire the book's closeness to experience. It tells what its writers have found reliable in the years of their intimate contact with patients."

Beginning with a short chapter on historical aspects of tuberculosis, the reader accompanies the patient through the steps incident to his first visit to the doctor's office, the taking of the personal history, the physical examination, the diagnosis, and the treatment.

Modern methods used in diagnosis and treatment are described, including the roentgenological examination, the significance and importance of the tuberculin test in diagnosis, laboratory methods, pneumothorax, and other forms of compression and collapse therapy. Respective chapters are assigned to the subject of heliotherapy and the part climate plays in the treatment of pulmonary tuberculosis.

After having surveyed the results of various attempts by physicians and others in different parts of the world to produce a serum, vaccine, or drug as a specific treatment for pulmonary tuberculosis the authors conclude "it is evident that the long looked for specific drug, vaccine, or serum which will have a specific curative effect on tuberculosis is still as elusive as in the days of Robert Koch."

Separate chapters are devoted to pulmonary tuberculosis in childhood with special reference to its significance, pulmonary tuberculosis in the aged, diet, rehabilitation, the heart in pulmonary tuberculosis, questions relating to marriage and pregnancy among the tuberculous, dangerous trades, and finally a chapter on the prevention of tuberculosis.

The reviewer suggests more recent reference for the chapter on Rehabilitation of the Tuberculous, a phase of the community control of tuberculosis which has been greatly neglected in the past.

For completeness a brief summary and selected references for supplementary reading follow the majority of the chapters, and throughout the book are well considered diagrams, charts and X-ray reproductions.

Public health administrators also will find this book of interest and of value for ready reference purposes.

BERNARD S. COLEMAN

A Textbook in Physiology—*By William D. Zoethout, Ph.D. (5th ed.) St. Louis: Mosby*, 1935. 694 pp. Price, $4.00.

Since 1916 this splendid text has

gone through 5 editions. The present one has been extensively rewritten, and chapters on material concerning which modern research is bringing such rapid changes have been brought up to date.

This book is definitely an effort to reach the happy medium between the extensive and intensive text needed by students and specialists in medicine, and the much briefer and often too elementary short texts in physiology.

Following brief chapters on Protoplasm, Enzymes, Tissues, and the "Translocation of Matter" the author discusses the usual divisions of physiology. The practical side of physiology has been kept in mind, and the chapters on nutrition, physical exercise, mental work, and fatigue are good bases for personal hygiene guidance.

Certain chapters are headed by lists of related subjects with page references to the text. This is a decided help in giving students the concept that body parts and "systems" are definitely interrelated. CHARLES H. KEENE

BOOKS RECEIVED

THE CHILD OF THE TEXAS ONE-TEACHER SCHOOL. By Annie Webb Blanton. Study No. 17, Bureau of Research in the Social Sciences, The University of Texas Bulletin, Austin, Tex. 111 pp.

CREATIVE RE-EDUCATION. By Frederick Peterson, M.D., Ph.D., LL.D. New York: Putnam's, 1936. 112 pp. Price, $1.00.

THE DOCTOR AND THE PUBLIC. A Study of Sociology, Economics, Ethics, and Philosophy of Medicine, Based on Medical History. By James Warbasse, M.D. New York: Paul B. Hoeber, Inc. Medical Book Department of Harper and Brothers, 1936. 572 pp. Price, $5.00.

FOOD, FITNESS AND FIGURE. By Jacob Buckstein, M.D. New York: Emerson Books, 1936. 252 pp. Price, $2.00.

THE FUNDAMENTALS OF PERSONAL HYGIENE. By Walter W. Krueger, Ph.B. 2d ed. Philadelphia: Saunders, 1936. 294 pp., ill. Price, $1.75.

HANDBOOK ON SOCIAL WORK ENGINEERING—AN OUTLINE. By June Purcell Guild, and Arthur Alden Guild. Richmond, Va.: Whittet & Shepperson, Publishers, 1936. 133 pp. Price, $1.50.

HUMAN GENETICS AND ITS SOCIAL IMPORT. By S. J. Holmes. New York: McGraw-Hill, 1936. 414 pp. Price, $3.50.

THE PATIENT AND THE WEATHER. Vol. I, Part II—Autonomic Integration. By William F. Petersen, M.D., assisted by Margaret E. Milliken, S.M. Ann Arbor, Mich.: Edwards Bros., 1936. 780 pp. Price, $9.00.

PRINCIPLES AND PRACTICE OF RECREATIONAL THERAPY FOR THE MENTALLY ILL. By John Eisele Davis, with Dr. William Rush Dunton, Jr. New York: Barnes, 1936. 206 pp. Price, $3.00.

PROSTITUTION. By Tage Kemp, M.D. Copenhagen, Denmark: Levin & Munksgaard, Publishers, Nörregade, 6. 1936. 253 pp., paper bound. Price, $10.00.

SLIM & SUPPLE: A NEW SYSTEM OF SWEDISH EXERCISES FOR YOUNG AND OLD. By Barbro Leffler-Egnell, translated from the Swedish by Greta Olsson. New York: Appleton-Century, 1936. 209 pp., ill. Price, $2.00.

THE TEACHING OF ARCHERY. By Dave and Cia Craft. New York: Barnes, 1936. 81 pp., ill. Price, $1.00.

FACTS ABOUT COMMERCIALLY CANNED FOODS. American Can Company. "A collection of discussions from factual advertisements." New York, 1936. 36 pp.

SEX-EDUCATION. By Maurice A. Bigelow. New York: The American Social Hygiene Association, 1936. 307 pp. Price, $1.00.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Diphtheria in Large Cities—Again evidence is presented that where diphtheria immunization is practised consistently, diphtheria deaths and morbidity drop. Though diphtheria death rates in the large cities were lower in 1935 than in 1934, there are far too many preventable deaths from this cause.

ANON. Diphtheria Mortality in Large Cities of the United States in 1935. J.A.M.A 106, 24:2060 (June 13), 1936.

Less Typhoid Fever—In the annual compilation of typhoid fever deaths in the largest cities of the United States is shown a gratifying reduction during the year 1935 as compared with 1934. All sections except the South Atlantic and the Western groups showed decreases.

ANON. Typhoid in the Large Cities of the United States in 1935. J.A.M.A. 106, 23:1983 (June 6), 1936.

They Still Go Unvaccinated—At this college, 33 of each 1,000 students admitted never having been vaccinated. Those with scars gave an immune reaction in 75 per cent of cases; those with history of vaccination but no scar revealed 35 per cent immune reactions, while only 5 per cent of those never vaccinated were immune.

BULL, R. C., and RANKIN, S. L. Smallpox Immunity in 5,000 College Students. Pub. Health Rep. 51, 23:734 (June 5), 1936.

What Can Health Do for Safety?—Pleading for public health participation in highway accident prevention, this Canadian author points out the opportunities for the experimental method of preventive medicine in establishing causes and testing control measures.

BURNETTE, N. L. Death in Safety Week. Canad. Pub. Health J. 27, 6:267 (June), 1936.

New Field for Nurses—Summary of the way various countries are using the nurse in commercial aviation and in the development of air ambulances.

CARTER, M. L. The Nurse and Aviation. Internat. Nurs. Rev. 10, 2:118, 1936.

Interviewing the Midwife—Leading questions by which supervising nurses may evaluate midwives' services are discussed.

DERRYBERRY, M., and DANIEL, J. The Development of a Technique for Measuring the Knowledge and Practice of Midwives. Pub. Health Rep. 51, 24:757 (June 12), 1936.

Toward Preserving Public Health—Another excellent paper on the economics of public health. (We have had several lately.) The author quotes the remark that, though the horse can be led to water but not made to drink, still it is possible to make him thirsty. Health education is the way to make the public thirsty for health. A dispassionate view of medical economic problems ends the paper.

EMERSON, K. Health Security. New Eng. J. Med. 214, 24:1211 (June 11), 1936.

Nursing for a Community—Nursing service for a community, to be adequate, must be based upon a satisfactory program of nursing education that prepares nurses not only for hospital service but for the varied health and sickness needs of the community. Suggestions are made for setting up necessary machinery for distributing this service, so that it will be available according to the needs of the individual

and family, rather than according to his ability to pay.

GOODRICH, A. W. The Community Nurse. Ohio Nurses Rev. 11, 2:78 (Apr.), 1936.

Difficulties in Polio Prophylaxis—Accepting the hypothesis that the virus of poliomyelitis enters the body through the olfactory tract, and migrates intracellularly through the nervous system to the cord, where it makes the tissue resistant to reinfection, and that only then does it escape to excite antibody formation in the blood, it is probable that artificially induced antibodies are not necessarily a measure of nerve tissue resistance.

HUDSON, N. P., *et al.* Factors of Resistance in Experimental Poliomyelitis. J.A.M.A. 106, 24:2037 (June 13), 1936.

Antirachitic Milk Values—Relative potency of vitamin D, as it affects human infants, and as found in the various commercial vitamin D milks is the subject of this report, presented in two installments. Its object is to aid physicians, health workers, and milk producers alike.

JEANS, P. C. Vitamin D Milk. J.A.M.A. 106, 24:2066 (June 13), 1936.

Eugenics vs. Cancer—Controlled experimentation with mice reveals definite information about hereditary factors which influence development of cancer. But human nature, being what it is, there is little chance of putting this information into practical use.

LITTLE, C. C. The Present Status of Our Knowledge of Heredity and Cancer. J.A.M.A. 106, 26:2234 (June 27), 1936.

All about School Child Health—What the school teacher and the school nurse may do to make their combined efforts a satisfactory health education program for school children, leads this series of excellent articles on school hygiene.

WHITNEY, A. Team work in School Health Education. Pub. Health Nurs. 28, 6:372 (June), 1936.

BEATTY, W. W. Sex Education in the Public School. p. 376.

CLINE, L. V. The Nurse in the Modern School. p. 380.

CHAYER, M. E. Changing Conceptions of School Nursing. p. 385.

PLEASANT, F. J. A New Deal for the Preschool Child. p. 393.

Tuberculosis among Nurses—Incidence of tuberculosis among nurses employed in tuberculosis sanatoria is reviewed, with valuable recommendations on ways to minimize the hazard.

MARIETTE, E. S. The Tuberculosis Problem among Nurses in a Tuberculosis Sanatorium. Am. J. Nurs. 36, 6:605 (June), 1936.

Cheerful Findings about Heart Disease—In this Canadian study it was found that 75 per cent of heart deaths occurred in people over 60, and that the percentage of later deaths is increasing. The average age at death grows greater, and hence the causes of death must change.

OILLE, J. A. The Problem of Heart Disease in Adults. Canad. Pub. Health J. 27, 6:261 (June), 1936.

Home Emergency Care of Postpartum Patients—Describes the procedure used in giving hypodermoclysis to postpartum patients in the home to prevent shock from hemorrhage and to replace fluids lost through dehydration.

PERRY, H. Hypodermoclysis for the Post Partum Patient in the Home. Am. J. Nurs. 36, 6:588 (June), 1936.

Milk Improvement in England—This discussion of the "accredited herd" program in Great Britain will be of interest to American sanitarians who are concerned with the improvement of our milk supply, not so much because of new proposals, but as a comparison with this country's problems.

RABAGLIATI, D. S. The Accredited Producers' Scheme of the Milk Marketing Board. Pub. Health. 49, 9:310 (June), 1936.

Home of General P. G. T. Beauregard on Chartres Street—The fine example of New Orleans Colonial architecture, home of the Confederate hero, is now being saved as a shrine for his relics and Civil War records by a group of New Orleans patriots under the leadership of Gen. Allison Owen.

THINGS IN NEW ORLEANS YOU WILL WANT TO SEE

THE Sub-Committee on inspection trips has arranged a tentative program for the Annual Meeting of the American Public Health Association, which embraces visits to the New Orleans Water Purification Plant and a survey of the sewerage and water systems of New Orleans.

The Sewerage & Water Board, which is a non-political board, was organized and began to function in 1899. Before that time rain water collected in wooden cisterns and the raw Mississippi River water were the only sources of drinking water in the city. At that time the water was obviously not very pure or clean.

The following table will give an idea of the improvements which have resulted in the water supply since the formation of the Sewerage and Water Board.

The water purification station, which has been copied in the essential details by several municipalities around New Orleans, is a model type of the rapid filtration systems generally in use for turbid waters.

The Purification Plant is reached readily in 20 minutes from the center of town and transportation will be provided, with the coöperation of the Sewerage and Water Board, for those desiring to visit the plant, where competent guides will explain the technical details which are necessary to put out the very satisfactory water which is furnished the City of New Orleans.

There are 28 filters with a total filtering area of 40,068 sq. ft. When operated at rated capacity, they are capable of filtering 112 million gallons of treated water per day.

	Before Treatment (Miss. River Water)	*After Treatment* (N.O. Tap Water)	*Maximum Allowed Under U.S. Public Health Standards*
Physical Characteristics (Parts per million)			
Turbidity	600	0.5	5.0
Color	10	5	20
Odor	Earthy	0	0
Chemical Characteristics (Parts per million)			
Calcium (Ca)	38	15	..
Magnesium (Mg)	8	6	100
Iron (Fe)	0.03	0.015	0.3
Zinc (Zn)	..	.03	5.0
Lead (Pb)	..	.001	0.1
Copper (Cu)	..	.05	0.2
Sulphate (So4)	42	44	250
Chlorides (Cl)	16	16	250
Total Solids	850	150	1,000
Bacterial Characteristics (1934)			
B. Coli per 100 ml.	1,940	0.06	1.0

This particular trip should prove of interest to all attending the Convention, and especially to the Laboratory and Public Health Engineering Sections.

In addition to providing water, the board is responsible for the adequate drainage of the city, and the achievement of this objective has been one of the triumphs of science in New Orleans.

New Orleans, as a whole, is below high water in the Mississippi River, which borders it on one side, and the greater portion of it is also below high water in Lake Pontchartrain, which bounds it on the north, and high water in the navigation canals and high level outfall drainage canals, which extend into or through the city. The city depends for its protection on the great levees along these waters, and the further judicious operation of the Bonnet Carré Spillway built by the United States Government at Bonnet Carré, La. As compared with mean tide level, the various portions of the city range from, say 14 ft. above to 3 ft. below mean tide, and extreme high lake tides are, on rare occasions, as much as 5 ft. above mean tide, and the highest water in the river reaches over 20 ft. mean tidal level.

From the above, it is evident that New Orleans depends on pumping for the removal of all the storm water and sewage which has to be removed.

The pumps used both in the sewerage and drainage work were especially designed by the engineer in charge of the Sewerage and Water Board Power and Pumping Stations; the drainage pumps being of very unusual size and high efficiency, and the sewage pumps combining very high efficiency with the ability to pump any kind of trash which enters sewers without any tendency to become obstructed thereby.

It might be said that pumps modeled after the pumps referred to are in use in Holland, Calif., and various other places. Their inspection and explanation alone would amply repay any visitor interested in mosquito eradication by drainage or in the salvage of marsh lands for agricultural purposes.

A third function of the Sewerage and

Water Board is the disposal of sewage. The sewage, consisting of polluted waste water from houses, factories, etc., is collected in a system entirely separate from the system of pipes and canals that receive the surface water or storm drainage. House connections, 76,306 in number (serving about 110,000 premises), and nearly all 6″ in size, conduct the sewage into 653.7 miles of sewers. More than 556 miles of these are 8″ in size, others are larger; the largest main sewer is of brick, 7′ in diameter. There are 9,236 manholes giving access to these sewers.

The sewerage system covers about 652 miles of streets and receives the sewage of about 110,254 premises with the scattering of population over very wide areas.

Eight first-lift pumping stations lift the sewage on its way to the main pumping stations, and, in three cases, a second lift pumping station is needed before the final discharge stations can be reached, making 11 intermediate stations in all. These are all electrically driven and automatically operated, without any screening of the sewage or any attendance other than periodic visits to see that all is well.

Four final discharge stations A, B, and D, on this side of the river, and C in Algiers, pump the sewage through cast iron discharge mains into the Mississippi River well down stream, whence the continuous flow of the river soon brings it to the Gulf. These too, are electrically driven, and operate without screening of the sewage, but attendants are constantly on duty.

In the 11 intermediate stations there

The Conciergerie—Old New Orleans—Combined entrance and janitor's quarters—only conciergerie in the United States—of the original Ursuline Convent on Chartres Street; built in 1727, Mississippi Valley's oldest building. Through these gates "Les Filles a Cassette" passed.

are 27 pumps having a total capacity of 306,180,000 gallons per day. In the 4 final discharge stations there are 15 pumps having a total capacity of 528,768,000 gallons per day. Pumping Station A, alone (the largest of the sewage pumping stations) pumps 17,000,000,000 gallons in a year, enough to make a lake 10′ deep, covering an area of over 8 square miles. Even this vast quantity of water is lost in the immensity of the flow of the river; the sewage never reappears at the surface; and no test made further down stream has ever indicated its presence in the river water.

Another trip of particular interest which has been arranged, will require approximately a day for its accomplishment, and to which will be attached a small cost, is a visit to the National Leprosarium at Carville, as well as a visit to the State Capitol at Baton Rouge, with its marvelous capitol building.

Located in New Orleans also is one of the finest hospitals of the U. S. Public Health Service, the Marine Hospital, which is located next to Audubon Park, one of our most beautiful places of interest in the city. It is thoroughly modern and from a standpoint of handling imported communicable diseases, will amply repay any visit made by health officers or others.

It must not be forgotten that New Orleans has located on its west bank a very modern Quarantine Station, where the most efficient methods of gaseous disinfection are carried out. The officer in charge of the station at present has gained world-wide note for his constant research for improvement in the use of hydrocyanic gas in the disinfection of vessels which come into port and require treatment.

There are many canneries of syrup and seafoods located in or near the city which should offer an attractive exhibit of modern methods in the handling of the most important industry of food canning.

The laboratories devoted to rodent control are operated continuously, and in view of the interest in endemic typhus and the other members of the Rocky Mountain spotted fever group, as well as bubonic plague, offer an opportunity for those unacquainted with the methods used for rodent examination to make a study of the subject.

A particular matter of interest, which is an object lesson of the value of drainage, and which is a great source of pride to New Orleanians, is the reclamation of the marsh area just behind the shores of Lake Pontchartrain, which has resulted in the creation of one of the largest and most beautiful parks in the world, the New Orleans City Park, as well as the creation of a park area and future residential district, where before only swamps existed, and in the erection of one of the finest airports in the world, if not the finest.

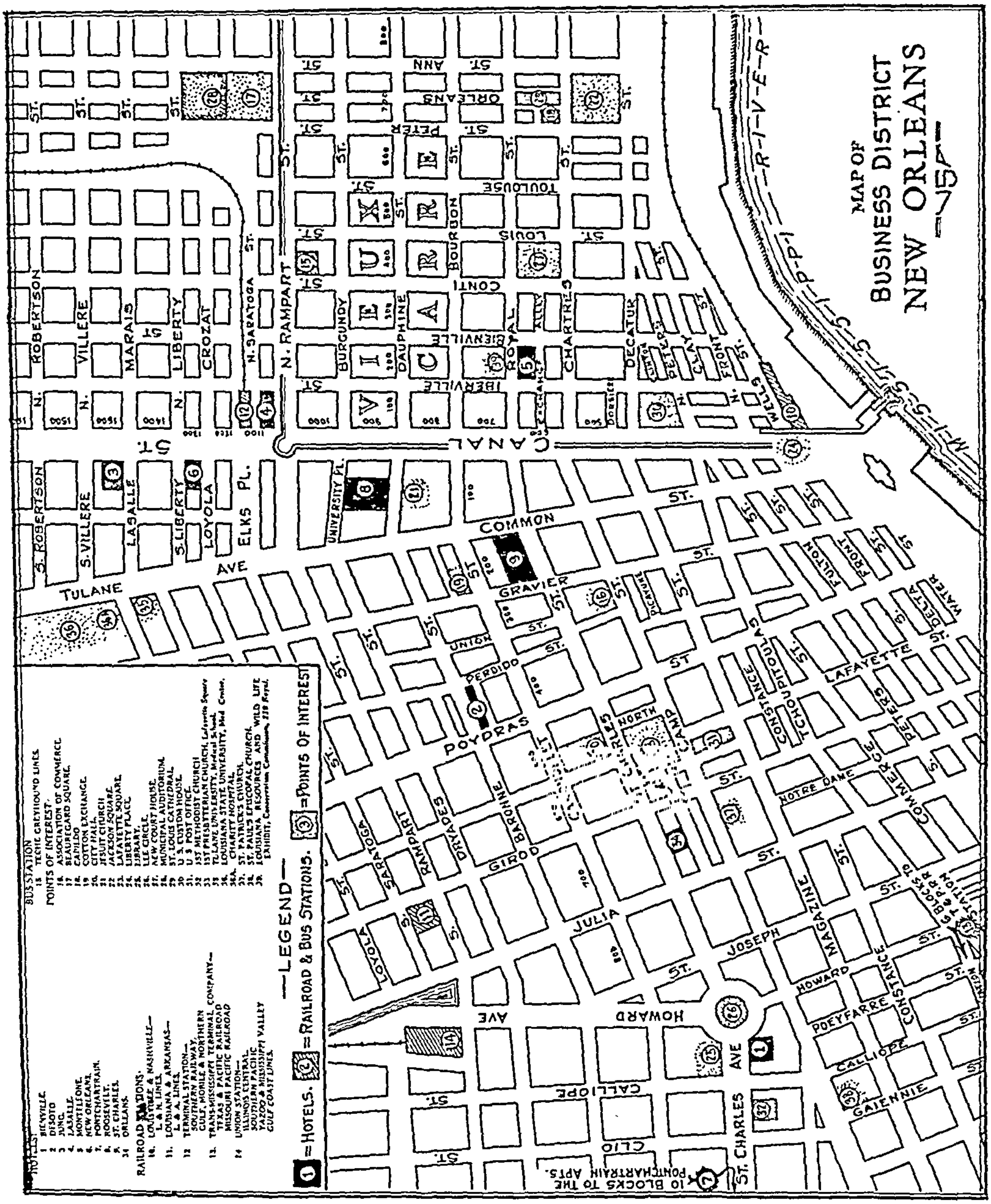
Many other inspection trips of in-

St. Louis Cathedral—The site of this old church was laid out by Bienville when he founded New Orleans in 1718; the present church is the third to occupy the grounds. It was built in 1796.

Madame John's Legacy—This building dates back to the days before the Louisiana Purchase (1803) when the colorful Dons of Spain imposed upon the resentful Creoles of Louisiana an obnoxious government.

terest for those of special trend are available and ample facilities for transportation will be provided.

Space does not permit any further statement, at this time of the points of interest in New Orleans, but the visitor may be assured that every effort will be exerted to make available for him all places of sanitary, as well as historical interest, and anyone contemplating visiting New Orleans, who is interested in any particular subject, is invited to write in advance to the Chairman of the General Committee of Arrangements, Dr. J. M. Batchelor, New Orleans, La., in order that the desires of the writer may be satisfied when he visits New Orleans.



See Opposite Page for Hotel Rates

ANNUAL MEETING INFORMATION

HOTELS

NEW ORLEANS, LA.

Hotels	*Room Capacity*	*Single* *Without Bath*	*Single* *With Bath*	*Double* *Without Bath*	*Double* *With Bath*	*Apartments*
Bienville	120	$2.00	$2.50–$3.00	$3.00	$3.50–$6.00	
De Sota	100	1.50	2.50– 3.00	2.50	3.00– 6.00	$6.00–$12.00
Jung	650	....	2.50– 4.00	....	3.50– 6.00	
LaSalle	...	1.50– 2.00	2.00– 2.50	2.50– 5.00	3.00– 5.00	5.00– 7.00
Monteleone	600	1.50– 2.00	2.50– 4.00	2.50	3.50– 6.00	
New Orleans	275	....	2.50– 3.50	....	3.50– 5.00	
Pontchartrain	200 (80 apts.)					4.00– 10.00
Roosevelt	...	....	3.00– 5.00	....	4.00– 8.00	10.00
St. Charles	...	....	2.50– 5.00	....	3.50– 8.00	8.00– 20.00
Orleans	50	1.50	2.00– 2.50	2.00– 2.50	2.50– 3.00	

..........*(Cut off on this line and mail to the hotel of your choice)*..........

HOTEL RESERVATION BLANK FOR NEW ORLEANS MEETING

AMERICAN PUBLIC HEALTH ASSOCIATION

50 WEST 50TH STREET, NEW YORK, N. Y.

OCTOBER 20–23, 1936

To ....
(Name of Hotel)

Please reserve for me .... rooms for .... persons for the A.P.H.A. Meeting.

Single room .... Double room ....

Maximum rate per day for room $.......... Minimum rate per day for room $..........

I expect to arrive .... If date of arrival is changed I will notify you at least 24 hours in advance.

Please acknowledge this reservation.

Name ....

Street address ....

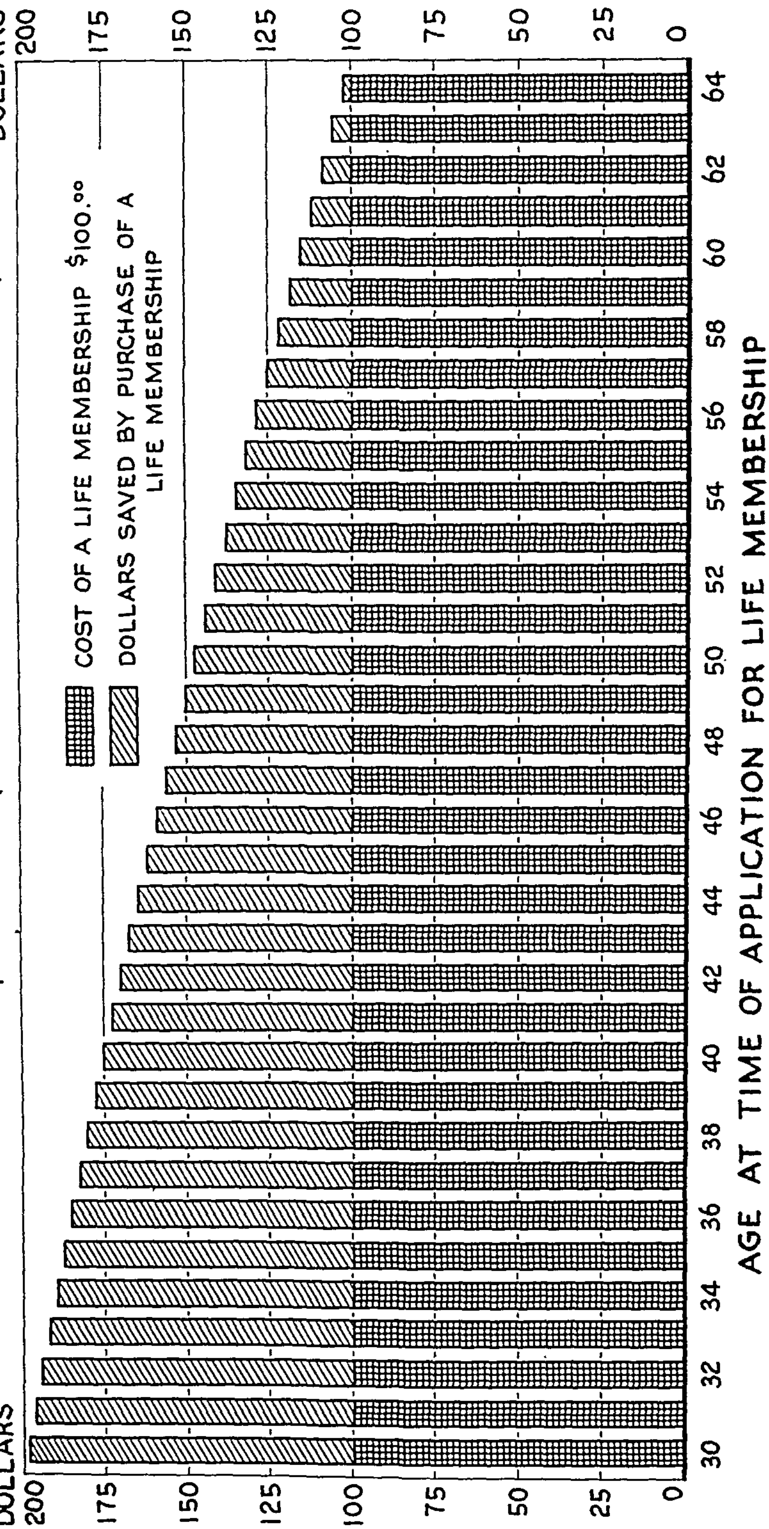
City .... State ....

DOLLARS SAVED BY THE PURCHASE OF A LIFE MEMBERSHIP

[*In place of payment of annual dues*]

IN THE AMERICAN PUBLIC HEALTH ASSOCIATION

Data furnished by the Metropolitan Life Insurance Company



ASSOCIATION NEWS

Recommended Change in the Constitution and By-Laws

THE Committee on Constitution and By-laws, acting on a suggestion made at a meeting of the Governing Council in Milwaukee, has recommended a change in the Constitution to provide that all members of the Executive Board will automatically be members of the Governing Council, thus obviating the confusion which has sometimes occurred. Some members of the Executive Board have been able to attend meetings of the Governing Council only by sufferance, although they were charged with acting for the Council during the intervals between Council meetings. The first paragraph under Article III Governing Council, therefore would read:

A. Composition: There shall be a Governing Council consisting of:

1. The officers of the Association and the elective members of the Executive Board.

Nominations for the Governing Council

IN accordance with the By-laws of the Association, the Nominating Committee reports the following nominations for the Governing Council. The Constitution provides that " upon the petition of twenty-five Fellows, the Nominating Committee shall add the name of any Fellow to this list, providing such petition is received fifteen days before the Annual Meeting."

The ten Fellows receiving the highest number of votes on a written ballot cast by the Fellows present and voting at the Annual Meeting in Milwaukee will be elected for the three year term 1936–1939.

G. F. Amyot, M.D., D.P.H.
Health Unit
North Vancouver, B. C.

G. W. Anderson, M.D.
Department of Health
Waban, Mass.

E. L. Belknap, M.D.
Globe Union Manufacturing Co.
Milwaukee, Wis.

A. J. Chesley, M.D.
Secretary and Executive Officer
State Department of Health
Old Capitol
St. Paul, Minn.

C. F. Craig, M.D.
Tulane University
New Orleans, La.

W. J. V. Deacon, M.D.
Department of Health
Lansing, Mich.

Marjorie Delavan
State Department of Health
Lansing, Mich.

Almon L. Fales
Metcalf & Eddy
Boston, Mass.

A. Grant Fleming, M.B.
Medical Building
McGill University
Montreal, Canada

J. C. Geiger, M.D.
Health Officer
San Francisco, Calif.

Major A. Parker Hitchens
Walter Reed General Hospital
Army Medical Center
Washington, D. C.

Prof. Murray P. Horwood
Massachusetts Institute of Technology
Cambridge, Mass.

Charles H. Keene, M.D.
Professor of Hygiene
University of Buffalo
Buffalo, N. Y.

W. H. Kellogg, M.D.
University of California
Berkeley, Calif.

H. E. Kleinschmidt, M.D.
National Tuberculosis Association
50 West 50th Street
New York, N. Y.

Pearl McIver, R.N.
Division of Quarantine
U. S. Public Health Service
Washington, D. C.

H. S. Mustard, M.D.
1923 E. Monument Street
Baltimore, Md.

Raymond S. Patterson, Ph.D.
Life Conservation Service
John Hancock Life Insurance Company
Boston, Mass.

Grace Ross, R.N.
Department of Health
Detroit, Mich.

Henry F. Vaughan, Dr.P.H.
Commissioner of Health
Detroit, Mich.

By Petition

Earnest Boyce, C.E.
Division of Sanitation
State Board of Health
Lawrence, Kans.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Charles F. Blankenship, M.D., 302 Marine Hospital, New Orleans, La., Assistant Surgeon, U. S. Public Health Service, with Regional Consultant, 4th District

Anthony S. Culkowski, M.D., City Hall, Lackawanna, N. Y., Health Officer

Charles P. Drury, M.D., City Hall, Marquette, Mich., Health Officer

John E. Dunn, Jr., M.D., Rm. 204, Federal Office Bldg., San Francisco, Calif., Assistant Surgeon, U. S. Public Health Service

Oswald F. Hedley, M.D., Maloney Bldg., University of Pa., Philadelphia, Pa., Passed Assistant Surgeon, U. S. Public Health Service

Frederick W. Kratz, M.D., State Health Dept., Bismarck, N. D., Passed Assistant Surgeon, U. S. Public Health Service

Samuel B. McPheeters, M.D., Health Dept., Goldsboro, N. C., Director, Wayne County Health Dept.

Robert A. MacTaggert, 4 Nott Terrace, Schenectady, N. Y., Acting Health Officer

William L. Orr, M.D., Ozark, Ala., Health Officer, Dale County Health Unit

Hermon B. Smith, D.V.M., P. O. Box 71, Farmville, N. C., Health Officer

Michael J. Sullivan, M.D., 66 W. Main St., Meriden, Conn., City Health Officer

Russell E. Teague, M.D., C.P.H., 306 Guthrie Bldg., Paducah, Ky., Health Officer

Laboratory Section

Lewis W. Brown, M.D., 160 Roseville Ave., Newark, N. J., Pathologist, Essex County Hospital for Contagious Diseases

John M. Dannecker, 1425 Lesseps St., New Orleans, La., Chemist, City Board of Health

Isaac H. Erb, M.B., 67 College St., Toronto, Ont., Canada, Pathologist, The Hospital for Sick Children

Anne G. Irwin, 519 Dexter Ave., Montgomery, Ala., Bacteriologist, State Dept. of Health

Raymond A. Kelser, Ph.D., D.V.M., Army Medical Research Board, Ancon, C. Z.

Walter H. Nolan, 63 Old Harbor St., S. Boston, Mass., Volunteer Assistant, Bacteriological Laboratory, City Health Dept.

James E. O'Brien, 545 W. 111 St., New York, N. Y., Chief Bacteriologist, W.P.A.

Monroe A. Rosenbloom, M.D., 1100 Park Ave., New York, N. Y., Senior Clinical Assistant Gynecologist, Out-Patient Dept., Mt. Sinai Hospital

Morris Scherago, D.V.M., University of Ken-

tucky, Lexington, Ky., Head, Dept. of Bacteriology

Public Health Engineering Section

Louis A. Cornelius, 2089 Robinson Rd., Grand Rapids, Mich., Member, Advisory Committee, Local Health Dept.

Clare H. Currie, C.E., Webster City, Ia., Consulting Sanitary Engineer

Benjamin L. Grimes, Jr., Box 933, Juneau, Alaska, Territorial Sanitary Engineer

Horace G. Tuggle, 440 Reese, Memphis, Tenn., Director, Sanitation and Malaria Control, Shelby County Health Dept.

Industrial Hygiene Section

Norman DeNosaquo, M.D., 219 Butler Ave., Providence, R. I., Student, Harvard School of Public Health

Charles C. Dills, 2028 New Hampshire St., Lawrence, Kans., Industrial Hygiene Engineer, State Board of Health

Joseph J. Eller, M.D., 745 Fifth Ave., New York, N. Y., Consulting Dermatologist

Donald O. Hamblin, M.D., Calco Chemical Co., Inc., Bound Brook, N. J., Chief Physician

Harry J. Johnson, M.D., Life Extension Institute, 25 W. 43 St., New York, N. Y., Chief, Examining Staff

Masayashi Yamaguchi, M.D., Dept. of Public Health, Yale Medical School, New Haven, Conn., Student

Child Hygiene Section

Elizabeth I. Adamson, M.D., 67 Park Ave., New York, N. Y., Consultant in Psychiatry

Emilio de Soto, M.D., Harriet Lane Home, Johns Hopkins Hospital, Baltimore, Md., Student

Nathan E. Silbert, M.D., C.P.H., 19 Goodale Rd., Mattapan, Mass., Student, Harvard School of Public Health

Public Health Nursing Section

Rocia Dority, R.N., Box 404, Canton, Ga., Field Consultant Nurse, State Dept. of Health

Jose Familar, Central Luzon Agricultural School, Nueva Ecija, P. I., Supervising Teacher of Hygiene and Sanitation, Bureau of Education

Bessie P. Hanson, R.N., 743 Sixth Ave., Troy, N. Y., Executive Secretary, Rensselaer County Tuberculosis and Public Health Assn.

Leeta A. Holdrege, R.N., 301 City Hall, Omaha, Nebr., Executive Director, Visiting Nurse Association of Omaha

Hetty I. Joach, Rm. 302, Court House, Jefferson City, Mo., County Public Health Nurse

Alice N. Jones, 42 N. Sheridan Ave., Indianapolis, Ind., Supervisor of School Nurses, Indianapolis Board of Health and Charities

Louise J. Keiber, 428 E. 133 St., New York, N. Y., Supervising Nurse, Mott Haven Health Centre

Martha J. Long, Heber Springs, Ark., County Health Nurse

Sadie E. McCarty, R.N., 708 Walnut, Fall River, Mass., Supervisor of Nurses, Board of Health

Clarina H. Morier, R.N., 759 Merrimack, Lowell, Mass., School Nurse, Board of Health

Ethel F. Murray, Hotel Aragon, Madera, Calif., Health Supervisor, Madera County Dept. of Education

Ethel Phillips, 115 E. Church St., Elmira, N. Y., Director, Visiting Nurse & Tuberculosis Assn.

Irma E. Reeve, 35 Elm St., New Haven, Conn., Associate Director, Visiting Nurse Assn. of New Haven

Emma E. Roberts, 332 Boston Place, Toledo, O., Director, Toledo District Nurse Assn.

Lila Sallee, Pocahontas, Ark., Public Health Nurse, Randolph County

Virginia D. Virgin, R.N., State Health Dept., Charleston, W. Va., Associate Director, Bureau of Venereal Diseases

Mary A. Ward, 3209 Delachaise St., New Orleans, La., Field Supervisor, Child Welfare and Community Health Assn.

Blanche Webb, 300 W. York St., Norfolk, Va., Director, The King's Daughters Visiting Nurse Assn.

Public Health Education Section

Embree G. Jaillite, 30 Rockefeller Plaza, New York, N. Y., Director of Publications, Public Health Committee of the Cup and Container Institute

Donald S. Lacroix, 25½ Pleasant St., Amherst, Mass., Hygiene Teacher, Amherst High School

Jacob A. Salzmann, D.D.S., 9915 Herrick Ave., Forest Hills, N. Y., Director, Dental Service, New York City Vocational Schools, Board of Education

Justin J. Shapiro, 707 Broadway, Paterson, N. J.

Epidemiology Section

Dr. Jose A. Lopez del Valle, Linea 78, Habana, Cuba, Director of School Sanitation, Finlay Institute

Roscoe L. Mitchell, M.D., 10 Burleigh St., Waterville, Me., Assistant Director, State Bureau of Health

Aurang Shah, M.D., C.P.H., P. O. Box 211, Boston, Mass., Student, Harvard School of Public Health

Unaffiliated

Harold Abramson, M.D., 1097 Madison Ave., New York, N. Y., Medical Inspector, and Field Epidemiologist, Bureau of Child Hygiene and Bureau of Preventable Diseases, New York City Dept. of Health

George F. Cottle, M.D., U.S.S. Pennsylvania, San Pedro, Calif., Medical Officer, U. S. Fleet

Luis Mazzotti, M.D., Huasteca 311, Mexico City, Mex., Student, School of Hygiene, Johns Hopkins University

Mary C. Raymond, 3307 Prytania St., New Orleans, La.

Howard Weinstein, 358 Ellsworth Ave., New Haven, Conn., Student, Dept. of Public Health, Yale School of Medicine

DEATHS

Jules Constantin, M.D., D.P.H., Roverval, P. Que., Elected Member 1933

Gertrude M. DeWitt, Chicopee, Mass., Elected Member 1920

Andronique Lafond, M.D., D.P.H., Parisville, P. Que., Canada, Elected Member 1933

Leslie Wentzel, Scranton, Pa., Elected Member 1922

CLOSING DATE FOR FELLOWSHIP APPLICATIONS

THE Committee on Fellowship and Membership wishes to announce that September 1 is the closing date for accepting Fellowship applications for action at the New Orleans Annual Meeting. Eligible members who desire to apply for Fellowship this year are requested to submit their applications to the committee as much in advance of September 1 as possible.

ASSOCIATIONS MEETING WITH A.P.H.A. AT NEW ORLEANS

THE following meetings of other associations will be held in New Orleans October 20–23, 1936, at the same time as the Sixty-fifth Annual Meeting of the American Public Health Association.

American Association of School Physicians
American Association of State Registration Executives
Conference of State Laboratory Directors
State Conference of Sanitary Engineers
Association of Women in Public Health
International Society of Medical Officers of Health

NEWS FROM THE FIELD

ANOTHER PUBLIC HEALTH AWARD GOES TO NEW YORK STATE

AT the 51st Annual Conference of the State and Provincial Health authorities of North America, held in Vancouver, B. C., June 22–24, 1936, a testimonial was presented to the New York State Department of Health. The awarding of this testimonial indicated, in the opinion of the Grading Committee, that the staff of the New York State Department of Health had in 1935 done more to develop an interest in the Health Conservation Contests than the staff of any other state department.

A testimonial on the above basis is given annually by the United States Chamber of Commerce. Dr. Arthur T. McCormack, State Health Officer of Kentucky, a member of the Health Conservation Contest Committee, made the presentation, and in the absence of Dr. Edward S. Godfrey, New York State Health Commissioner, Dr. John A. Ferrell accepted the testimonial. In making the presentation, Dr. McCormack stated that, in his opinion, in conducting these Contests the United States Chamber of Commerce and the American Public Health Association had undertaken one of the most inspiring public health activities. The Health Contest for cities and rural communities had already resulted in a great deal of publicity and, through the interest of the chambers of commerce, business men have had their attention definitely directed to the importance of public health. Business men and employers of labor had been impressed in a manner unknown hitherto, and were coöperating in programs for health betterment. The Contests have been the means of putting into actual practice many of the ideas and principles which health workers have discussed, but had never been able in whole or in part to convert into concrete public health advances.

Dr. Ferrell, in accepting the award, stated that New York State, with its large and complex population, had unusual public health problems, but, notwithstanding all this, it compared most favorably with other states in its solution of its problems, and in advances along public health lines. The interest shown in the Contests indicated that the state was ready to give time, thought, and effort to them because they were a specific aid in health promotion.

CRIPPLED CHILDREN DEPARTMENT IN NORTH CAROLINA

THE North Carolina State Department of Health has established a Department for Crippled Children in coöperation with the Children's Bureau of the U. S. Department of Labor, in the administration of the Social Security Act.

Objectives outlined in the bulletin of the health department are to locate crippled children, of whom it is estimated there are about 20,000 in the state; to obtain expert diagnosis in all parts of the state; to provide expert treatment and hospital care; to establish a field of supervisory service and follow-up service, and to engender public interest in the problem of the crippled child.

INDIANA APPOINTMENTS

THE following changes in Health Officers in the Indiana Division of Public Health have been announced:

Dr. Elmer D. Johns, of Zionsville, succeeding Dr. Lawrence S. Bailey as town Health Officer.

Dr. Camden G. Bothwell, of Martinsville, succeeding Dr. George B. Breedlove as Health Officer of Morgan County.

Dr. James L. Denaut, Health Officer of Hamlet.

Dr. Clyde J. Munns, of Newburgh, succeeding Dr. John T. Samples as Health Officer of Warrick County.

CANCER CAMPAIGN IN MAINE

A STATE committee has been formed to carry on a campaign against cancer which was recently launched under the auspices of the American Society for the Control of Cancer, the State Board of Health of Maine, and the Maine Medical Association.

The committee, of which Dr. Magnus F. Ridlon, of Bangor, is chairman, will provide free services of a pathologist, a radiologist, a roentgenologist, and a surgeon.

A woman's "field army" against cancer has been organized; and clinics have been established at Lewiston, Waterville, and Portland.

DIABETES CAMPAIGN IN OHIO

THE Public Health Federation of Cincinnati has recently formed a special committee on diabetes in coöperation with the Academy of Medicine of Cincinnati, with Dr. Cecil Striker as chairman.

The committee plans to establish an information bureau for physicians and the public, to make a study of the morbidity and mortality of diabetes, and to carry on public health education.

AUTOMOBILE VACATIONS

NEARLY 37 million persons in 11 million automobiles took vacations by motor in 1935, says the American Automobile Association.

AUTOMOBILE INSPECTION IN CHICAGO

SINCE July 1, all owners in Chicago, Ill., are required to have their automobiles inspected. This compulsory inspection is expected to reduce accidents by eliminating mechanical defects, and to lessen noise in the city.

Every automobile registered in Chicago must have an inspection twice a year.

CONNECTICUT HEALTH BULLETIN CELEBRATES FIFTIETH YEAR

THE *Connecticut Health Bulletin* celebrated its fiftieth anniversary with the May issue.

The May *Bulletin* reproduces various covers and pages from its earlier issues. The first number appeared in June, 1887, and it has been printed continuously since that time.

MME. IRENE JOLIOT CURIE HONORED

IRENE JOLIOT CURIE, daughter of the discoverers of radium, has been named Undersecretary for Scientific Research in the recently organized cabinet of the French Government.

Madame Joliot Curie, who from her childhood collaborated with the late Madame Curie in her research, shared the Nobel Prize in Medicine in 1935 with her husband, Frederic Joliot, for their work on radium.

PNEUMONIA RESEARCH GRANT

THE Commonwealth Fund of New York has approved an annual grant of $16,800 to the Michigan State Department of Health, Lansing, to promote study of antipneumococcic serum and to reduce the cost so as to make it available to the person of ordinary means. It will continue three years or longer, if sufficient progress is shown. . . . Last year the death rate from

pneumonia in Michigan was the highest since 1929.—*J.A.M.A.*, July 18, p. 219.

EVANSTON WINS SAFETY PRIZE

IN the Fourth National Traffic Safety Contest, sponsored in 1935 by the National Safety Council, Evanston, Ill., won the grand prize for the second time. Its motor death rate was 2.9 per 100,000. The national average for all cities of all population groups was 18.1.

MENTAL HYGIENE EXAMINERS APPOINTED

UNDER the provisions of a law passed by the 1936 legislature establishing a board of qualified examiners in the New York State Department of Mental Hygiene, the following have been appointed to constitute the board:

Dr. Frederick W. Parsons, Commissioner of Mental Hygiene

Dr. Vernon C. Branham, of Woodbourne, appointed by the Commissioner of Correction

Dr. Lloyd H. Ziegler, of Delmar, appointed by the Superintendent of Education

Dr. Israel Strauss, of New York, selected by the Medical Society of New York.

The code of criminal procedure has been amended to require that courts appointing a commission to examine persons charged with crime include at least one qualified psychiatrist.—*J.A.M.A.*, July 11, 1936, p. 137.

FLORIDA MATERNAL AND CHILD HEALTH BUREAU

A BUREAU of Maternal and Child Health in the Florida State Department of Health, Jacksonville, Fla., has been established. Dr. Emile Bryant Woods, Assistant Professor of Obstetrics and Gynecology, University of Georgia School of Medicine, Augusta, Ga., has been announced as the Director.

The new bureau will act in an advisory capacity to city, county, and district health departments, and will sponsor a statewide educational program. It was made possible through funds provided under the Social Security Act.

NETHERLANDS ANTIVENEREAL DISEASE CAMPAIGN

IN the conduct of an antivenereal disease campaign, each country selects a method in keeping with the national character. This explains why in the Netherlands the organization of this campaign is imbued with a spirit of independence and of hatred for coercive measures.

In place of official examinations of the genitalia of prostitutes and the compulsory registration of those infected, a policy based on persuasion and free will has been instituted. This operates through therapeutic stations open during the evening hours. The work of the stations is supplemented by consultation offices and by the coöperating services of women social workers who visit the infected women undergoing treatment.

It is the same approach that has been used with notable success in the fight on tuberculosis. In addition, propaganda against the venereal diseases is carried on through lectures, moving pictures and so on. The results in big cities such as Rotterdam have been most encouraging. — *J.A.M.A.*, July 18, p. 226.

BIRTH CONTROL GROUP ORGANIZED

THE National Medical Council on Birth Control was organized in June, 1936, for these purposes:

1. To control and supervise all medical policies of the American Birth Control League.
2. To initiate, encourage, and execute appropriate scientific research in the medical aspects of birth control.

The Executive Committee of the

Council is as follows: Frederick C. Holden, M.D., Chairman; Eric M. Matsner, M.D., Executive Secretary, member A.P.H.A.; Eliot Bishop, M.D.; A. N. Creadick, M.D.; Foster Kennedy, M.D.; Edgar Mayer, M.D., member A.P.H.A.; Richard N. Pierson, M.D.; Owen Toland, M.D.; Wilbur Ward, M.D.; and Prentiss Willson, M.D.

Headquarters of the National Medical Council on Birth Control are established at 515 Madison Avenue, New York, N. Y.

INSANITY OF WAR

PSYCHIATRISTS warn the world against the surrender of civilization to the insanity of war.

The Netherlands Medical Association, at The Hague, sponsored a document signed by 339 psychiatrists from 30 nations, in which they warn the statesmen of the world against unleashing the "destructive instincts which break loose as soon as the community feels itself threatened by danger."

NEW YORK'S CHILDREN'S CAMPS MUST REGISTER

IN a further effort to safeguard the health of New York City children, the New York Department of Health is requiring every agent, or agency, representing out of town camps for children to register detailed information with the Sanitary Bureau. This includes: a complete description of the camp's sanitary arrangements; description of the source of its milk supply; data on how many children are housed—what examination of food handlers is made before employment—whether the camp is operated under a State permit—whether or not the camp has a resident physician—whether or not a trained nurse is employed, and so forth.

Section 217a of the Sanitary Code provides that—

. . . All agencies in the City of New York taking children out of town to camps on vacation periods of more than one day shall register annually with the Department of Health of the City of New York through an authorized executive of such agency, stating the name, location and post office address of the camp, name of the director, the license number of the previous year and whether the camp is inspected by the Department of Health of the State where located.

While the majority of out of town camps operating out of New York City are licensed by the respective States, occasionally one is found not to have this protection.

HAY FEVER STUDY

A CHEMICAL study of substances in agricultural products and by-products that contribute to the allergic disturbances—hay fever, asthma, hives, and related afflictions—is being established in the Bureau of Chemistry and Soils of the U. S. Department of Agriculture, it has been announced.

One-tenth of the population of the country suffer seasonal distress or continual discomfort and restricted activity as the result of allergic diseases known by such familiar names as hay fever, pollen fever, rose fever, rose colds, asthma, hives, and so on. These afflictions affect people of all ages. Some individuals suffer from abnormal sensitiveness to certain normal constituents of the pollens produced by many varieties of trees, grasses, and weeds. Similar substances present in common foods, textile fibers, furs, and other farm products are also capable of causing distressing disturbances when absorbed through the skin or the membranes of the respiratory or digestive systems of supersensitive persons.

Chemists and specialists in other lines of scientific investigation will attempt to isolate these offending components and to determine their composition. Dr. Henry Stevens, biochemist of the Protein and Nutrition Division of the Bureau of Chemistry

and Soils is organizing the staff which will undertake the allergen investigation.

SILICOSIS PREVENTION

WHILE expressing gratification over the coöperation of employers in complying with the provisions of the silicosis prevention provisions of the industrial dust-hazard acts which became effective this month in New York State, State Industrial Commissioner Elmer F. Andrews today cautioned employers against final commitment, acceptance, and installation of dust-collecting and eradicating machinery before such machinery had been formally approved by the State Industrial Board.

Commissioner Andrews announced that he would immediately appoint an Advisory Committee to make a comprehensive study of machinery and methods and rules and regulations for the prevention of dust disease hazards, this committee to make recommendations to the Industrial Board which would take final and formal action. He called attention to the fact that the law requires the installation of approved dust-removing devices at the earliest opportunity, but also pointed out the danger of installing machinery which might later fail to meet official approval. While awaiting the action of the Industrial Board on various devices now being manufactured, the Commissioner admonished every employer to " take every reasonable precaution to reduce the dust hazard in his plant."

PERSONALS

WILLIAM H. PARK, M.D., F.A.P.H.A., Biggs Professor of Preventive Medicine and Director of Bacteriological Laboratories, New York University College of Medicine, has been granted a leave of absence for the session 1936–1937, and will retire after that period. Dr. Park has been connected with the University since 1895. He was Professor of Bacteriology and Hygiene from 1900 to 1933, when he received his present title. In the session of 1914–1915 he was Dean of the School of Bacteriology and Hygiene.

Dr. Park, for many years Director of the Department of Laboratories of the New York City Department of Health, reached the retirement age for that position December 20, 1933, but his term was extended, and was again extended June 5, to September 30.

ROBERT H. HAZEMANN, M.D., member A.P.H.A., has recently been made " Chef du Cabinet Technique " of the Ministère de la Santè publique. This is the first time that a secretary with public health training has been appointed.

CHARLES W. MCDONALD, M.D., member A.P.H.A., formerly Director of County Health Work of the Alabama State Department of Health, has been named head of the Gadsden County Health Department, recently organized, with headquarters in Quincy, Fla.

FRANK WINFIELD LAIDLAW, M.D., F.A.P.H.A., of Middletown, N. Y., formerly a District State Health Officer, has been provisionally made District Health Director of the New York State Health Department.

JOHN L. JONES, M.D., member A.P.H.A., of Medina, Ohio, has been appointed Special Investigator in the Bureau of Child Hygiene of the Ohio State Department of Health. He will make a detailed investigation of maternal deaths, in coöperation with the Hospital Obstetric Society of Ohio.

DR. ROBERT V. BOYCE has been named Acting Superintendent of Health of Hartford, Conn., succeeding Thomas F. O'Brien, M.D., member A.P.H.A., who was granted a leave of absence.

VERA H. JONES, M.D., member A.P.H.A., of Denver, Colo., has been named Director of Maternal and Child Health and Care of Crippled Children, under the Colorado State Board of Health and the Social Security Administration.

SAMUEL WEISSROSS, M.D., member A.P.H.A., has been appointed Director of the Bannock County Health Unit, Pocatello, Idaho.

HERBERT A. MCCLURE, M.D., member A.P.H.A., is Health Officer of the newly formed Health Department in Taylor County, with headquarters in Perry, Fla.

CHARLES HOWE ELLER, M.D., DR.P.H., member A.P.H.A., of Charlottesville, Va., has resigned as Health Officer of Albemarle County, to become Assistant Director of Rural Health with the Virginia State Health Department.

DR. JAMES R. KINGSTON, of Deer River, Minn., has been appointed Health Officer of the Northern District of Minnesota, with headquarters in Bemidji. The district is composed of Koochiching, Itasca, Hubbard and Beltrami Counties.

DR. ALICE HAMILTON, of Boston, Mass., F.A.P.H.A., technical adviser on industrial poisons, U. S. Department of Labor, was presented with the National Achievement Award of the Chi Omega Sorority, June 22.

ELLEN C. POTTER, M.D., member A.P.H.A., Director of Medicine of the New Jersey Department of Institutions and Agencies, received the honorary degree of doctor of laws at the annual commencement of the New Jersey College for Women, New Brunswick, N. J., June 6.

MILLARD E. WINCHESTER, M.D., F.A.P.H.A., of Brunswick, Ga., Health Officer of Glynn County, was presented in Superior Court, June 29, with a set of resolutions passed by the grand jury acknowledging his service and that of his staff in achieving national recognition for the Glynn County Board of Health in the Health Conservation Contest sponsored by the U. S. Chamber of Commerce and the American Public Health Association.

JAMES F. EDWARDS, M.D., member A.P.H.A., has retired as head of student health service and the Department of Hygiene, Iowa State College, Ames, Iowa, and is succeeded by Dr. John G. Grant, his assistant for several years.

PHILIP DRINKER, member A.P.H.A., has been promoted from Associate Professor to Professor of Industrial Hygiene, at Harvard University School of Public Health, Boston, Mass.

DR. RICHARD E. SHOPE, of the staff of the Princeton laboratory of the Rockefeller Institute for Medical Research, received a prize of $1,000 awarded by Sigma Xi on the occasion of its semicentennial in June. The award was made in recognition of Dr. Shope's work on swine influenza.

BENJAMIN G. HORNING, M.D., of the Connecticut State Health Department, has been named Superintendent of the Hartford Board of Health.

DR. WILDRIDGE C. THOMPSON, JR., who recently received the Certificate in Public Health at Johns Hopkins University, has been appointed full-time Medical Consultant in Social Hygiene in the New York State Department of Health.

DR. HELEN H. OWEN, of Albany, N. Y., has been provisionally appointed Assistant Director of the Division of Maternity, Infancy and Child Hygiene in the New York State Department of Health. She was formerly on the staff of the Division of Laboratories and Research.

DR. LLOYD A. MASTERSON, of Opelou-

sas, La., for 2 years Director of the St. Landry Parish Health Unit, has been promoted to Director of the Bureau of Maternity and Infant Hygiene of the Louisiana State Board of Health. Dr. Franklin V. Boyd, member A.P.H.A., of Lake Providence, succeeds Dr. Masterson as Health Officer.

DR. WILLIAM DOCK, Associate Professor of Medicine, Stanford University School of Medicine, San Francisco, Calif., has been appointed Secretary of the San Francisco Heart Committee, to succeed Dr. Amos Christie, who has resigned to engage in a two-year study at Johns Hopkins University Hospital for the U. S. Children's Bureau.

DR. WILLIAM BLAIR HUNTER, of Gastonia, N. C., has been appointed Health Officer of Harnett County.

DR. WILLIAM J. DONALD, of Lafayette, Ala., has been named Health Officer of Baldwin County, to succeed Dr. Stephen A. Durick, of Bay Minette, resigned.

RUTH HAY, who has been Assistant Professor of Public Health Nursing at Western Reserve University, has accepted a position as Director of the Course in Public Health Nursing in the School of Nursing at the University of California, Berkeley, Calif.

DR. WILLIS D. GILMORE, of Tombstone, Ariz., has been appointed Tuberculosis Consultant of the Department of Health of Arizona.

DR. JACK B. EASON, of Tucson, Health Officer of Pima County, Ariz., has been placed in charge of the new health unit in Yuma County.

DR. LEWIS C. ROWLES, of Clearfield, Pa., has been appointed Medical Director of Clearfield County, to succeed Dr. Horatio L. Woodside, of Bigler, member A.P.H.A., resigned.

DR. CHARLES E. LYCHT, Assistant Professor of Medicine and acting chief of student health, University of Wisconsin Medical School, Madison, Wis., has been appointed Professor of Health and Director of Physical Education for Men at Carleton College, Northfield, Minn.

DR. LOUIS TUFT has been appointed to succeed Dr. John L. Laird as head of the laboratory in the Pennsylvania State Department of Health.

DR. WILLIAM D. JENNINGS, JR., of Augusta, Ga., has been appointed to the newly created position of Police and Fire Surgeon.

DEATHS

DR. ARTHUR JACOB WOLFF, of Hartford, Conn., died June 22, at the age of 81 years. He was a bacteriologist in the Hartford Health Department for 32 years.

CLINTON T. MESSNER, D.D.S., chief of the Dental Department, U. S. Public Health Service, since 1924, died in Washington May 28.

CONFERENCES AND DATES

Aug. 2–8, Annual Meeting, National Institute for Commercial and Trade Organization Executives, Northwestern University, Evanston, Ill.

Aug. 11–14, American Veterinary Medical Association, Deshler-Wallick Hotel, Columbus, Ohio

Aug. 16–22, National Medical Association, Philadelphia, Pa.

Aug. 16–22, Annual Convention, National Hospital Association, Philadelphia, Pa.

Aug. 17–18, American City Planning Institute, Cambridge, Mass.

Aug. 18–20, League of Iowa Municipalities, Davenport, Iowa.

Aug. 19–21, Annual Meeting—Central States Section, American Water Works Association, Hotel Cleveland, Cleveland, Ohio

Aug. 22, National Conference on Pharmaceutical Research, Dallas, Tex.

Aug. 24–25, American Association of Colleges of Pharmacy, Dallas, Tex.

Aug. 24–29, Symposium on the Environment and Its Effect Upon Man, at the Harvard University School of Public Health, Boston, Mass.

Aug. 24–29, American Pharmaceutical Association, Dallas, Tex.

Aug. 28, Twelfth Annual Convention, California Dietetic Association, Fairmont Hotel, San Francisco, Calif.

Aug. 29–Sept. 6, Third Postgraduate Course of the International Hospital Association, Prague, Czechoslovakia.

Aug. 31–Sept. 5, Second International Medical Week, Lucerne, Switzerland, sponsored by the *Swiss Journal of Medicine*.

Aug. 31–Sept. 12, Harvard Tercentenary Conference of Arts and Sciences, Cambridge, Mass.

Sept. 1–4, Annual Conference, Governmental Research Association, Ann Arbor, Mich.

Sept. 2–4, Annual Convention, National Shade Tree Conference, Hotel Statler, Boston, Mass.

Sept. 2–4, Annual Convention, Union of Nova Scotia Municipalities, Digby, Nova Scotia.

Sept. 2–4, Annual Meeting, Ontario Municipal Association, Toronto, Ont.

Sept. 7–10, International Union Against Tuberculosis, Lisbon, Portugal.

Sept. 7–11, Sixtieth Anniversary Meeting, American Chemical Society, Pittsburgh, Pa.

Sept. 7–12, Third World Power Conference, National Power Policy Committee, Department of the Interior Building, Washington, D. C.

Sept. 9–12, Annual Meeting, American Forestry Association, Hotel Lakeside, Eagles Mere, Pa.

Sept. 14–17, Annual Convention, League of California Municipalities, Santa Monica, Calif.

Sept. 14–17, Annual Meeting, California Sewage Works Association, Santa Monica, Calif.

Sept. 15–30, First International Congress of Sanatoria and Private Nursing Homes; Margitsziget, Sanatorium, Budapest, Hungary.

Sept. 21–23, Annual Convention, American Institute of Park Executives and the American Park Society, South Bend, Ind.

Sept. 21–23, Annual Meeting, Rocky Mountain Section—American Water Works Association, Denver, Colo.

Sept. 22–25, Annual Meeting--New England Water Works Association, Pennsylvania Hotel, New York, N. Y.

Sept. 23–25, Annual Meeting of the New York State Association of Dairy and Milk Inspectors, Van Curler Hotel, Schenectady, N. Y.

Sept. 23–26, Mississippi Valley Conference on Tuberculosis, The Mississippi Valley Sanatorium Association, Hotel Pere Marquette, Peoria, Ill.

Sept. 24–25, Annual Meeting, League of Wisconsin Municipalities, Manitowoc, Wis.

Sept. 28–30, Public Works Congress—American Society of Municipal Engineers—International Association of Public Works Officials, Toronto, Ont.

Sept. 28–Oct. 1, American Society of Municipal Engineers, Toronto, Ont., Canada.

Sept. 28–Oct. 2, American Hospital Association, Cleveland, Ohio

Sept. 28–Oct. 2, American Association of Port Authorities, San Francisco, Calif.

Oct. 1–3, Southern Tuberculosis Conference, Hot Springs, Ark.

Oct. 5–9, Annual Safety Congress and Exposition, National Safety Council, Atlantic City, N. J.

Oct. 6–12, Fire Prevention Week.

Oct. 9, 10, New York State Sewage Works Association, Geneva, N. Y.

Oct. 10–18, National Dairy Show, National Dairy Association, Dallas, Tex.

Oct. 12, 13, Canadian Dental Association, Montreal, Que.

Oct. 12–15, Annual Convention—Southwest Section, American Water Works Association, Fort Smith, Ark.

Oct. 12–17, The Dairy Industries Exposition, Atlantic City, N. J.

Oct. 12–18, Third International Congress on Malaria, Madrid, Spain.

Oct. 14–16, Annual Convention, Pennsylvania Water Works Association, Haddon Hall, Atlantic City, N. J.

Oct. 14–17, Annual Civil Service Assembly of the United States and Canada, Cincinnati, Ohio.

Oct. 17–25, Centennial Exposition Dairy Show, Atlantic City, N. J.

Oct. 19–20, Conference of State Sanitary Engineers, New Orleans, La.

Oct. 19–21, Annual Meeting, International City Managers' Association, Richmond, Va.

Oct. 20–23 (Tues., Wed., Thurs., Fri.), Sixty-fifth Annual Meeting of the American Public Health Association, New Orleans, La. Meetings Headquarters, Municipal Auditorium; Residence Headquarters, Hotel Roosevelt.

Oct. 20–23, American Association of School Physicians, Hotel Roosevelt, New Orleans, La.

Oct. 20–23, American Association of State Registration Executives, New Orleans, La.

Oct. 20–23, Conference of State Laboratory Directors, New Orleans, La.

Oct. 20–23, State Conference of Sanitary Engineers, New Orleans, La.

Oct. 20–23, Association of Women in Public Health, New Orleans, La.

Oct. 20–23, International Society of Medical Officers of Health, New Orleans, La.

Oct. 21–23, Ontario Hospital Association, Toronto, Ont.

Oct. 21–24, Annual Civil Service Assembly of the United States and Canada, Cincinnati, Ohio

Oct. 26–28, Annual Meeting—Missouri Valley Section, American Water Works Association, Kansas City, Mo.

Oct. 26–28, National Association of Exterminators & Fumigators, Cleveland, Ohio.

Oct. 26–28, Annual Meeting, North Carolina Section—American Water Works Association, Hotel Charlotte, Charlotte, N. C.

Oct. 26–30, National Rehabilitation Association, San Antonio, Tex.

Oct. 29–31, Annual Meeting of the Association of Military Surgeons, Detroit, Mich.

Nov. 8–11, Annual Meeting, National Association of Commercial Organization Secretaries, Omaha, Nebr.

Nov. 9–12, Association of Dairy, Food and Drug Officials of the United States, Miami Biltmore Hotel, Coral Gables, Fla.

Nov. 9–15, American Education Week. Write: Educational Press Assn., N. J. *Educational Review*, 605 Broad Street, Newark, N. J.

Nov. 11–13, Refrigeration Service Engineers Society, Hotel Gayoso, Memphis, Tenn.

Nov. 17, 18, Fifth Annual Meeting of the Southern Branch, American Public Health Association, Baltimore, Md.

Nov. 17–20, Southern Medical Association, Baltimore, Md.

Nov. 20, 21, Sixty-Second Annual Meeting, New Jersey Health and Sanitary Association, Inc., Hotel Woodrow Wilson, New Brunswick, N. J.

Dec. 3–5, New Jersey Conference of Social Work, Asbury Park, N. J.

Dec. 28–30, Society of American Bacteriologists, Indianapolis, Ind.

Dec. 28, 1936–Jan. 1, 1937, American Association for the Advancement of Science, Atlantic City, N. J.

Dec. 28–31, Second National Confer-

ence on College Hygiene, Wardman Park Hotel, Washington, D. C.
Jan., 1937, California Society for Crippled Children, San Francisco, Calif.
Feb., 1937, County Engineers of California, Sacramento, Calif.
Feb. 20–25, 1937, National Association of State Directors of Educational Research, New Orleans, La.
Mar. 25–26, 1937, Western Shade Tree Conference, Santa Barbara, Calif.
Apr., 1937, Arizona State Public Health Association, Phoenix, Ariz.
Apr. 21–24, 1937, Society of State Directors of Physical and Health Education, New York, N. Y.
Apr. 21–24, 1937, American Physical Education Association, New York, N. Y.
Apr., 1937, California Tuberculosis Association, Riverside, Calif.
May, 1937, Association of Coroners and Public Administrators, Oakland, Calif.
May 23–29, 1937, National Conference of Social Work, Indianapolis, Ind.
May 31–June 3, 1937, National Tuberculosis Association, Milwaukee, Wis.
June, 1937, Eighth Annual Meeting of the Western Branch, American Public Health Association, Phoenix, Ariz.
June, 1937, Smoke Prevention Association, New York, N. Y.
June, 1937, Conference of Mayors and Municipal Officials, Saratoga Springs, N. Y.
June 7–11, 1937, Eighty-eighth Annual Session of the American Medical Association, Atlantic City, N. J.
June 21–26, 1937, American Association for the Advancement of Science, Denver, Colo.
July, 1937, Silver Jubilee Boy Scout Jamboree, Boy Scouts of America, Washington, D. C.
April, 1938, American Chemical Society, Dallas, Tex.

Positions Wanted

HEALTH OFFICERS

Young man, M.D. University of Tennessee Medical School; short course in public health at Vanderbilt University; 2 years' experience as director in a county health department; desires position as health officer. A-261

Physician, M.D. University of Maryland School of Medicine and C.P.H. Johns Hopkins University; nine years' experience as county and city health officer; desires position as director of a county or district with headquarters in a city. A-265

LABORATORY

Woman chemist, B.S. and M.S. degrees. Advanced work in food chemistry, nutrition and dietetics. Minor, bacteriology. Experience in analytical, organic and biochemistry. Desires position with hospital or commercial concern. L-259

Man, Ph.D. University of Wisconsin, several special courses in bacteriology, immunology, public health laboratory methods, etc.; 13 years' experience as assistant director in a state department of health laboratory and as Professor of bacteriology and hygiene at a university; desires position as bacteriologist. L-260

PUBLIC HEALTH ENGINEERS

Young man, graduate in engineering; several years' experience as director of a division of sanitation in a county health department; desires a position in public health engineering, administrative work preferred. E-250

Young man, graduate in civil engineering, University of Utah; post-graduate work in public health, Columbia University; 4 years' experience as sanitary engineer and supervisor of a health survey; desires position as assistant public health engineer. Available October, 1936. E-262

MISCELLANEOUS

Young man, M.D. Vanderbilt University; Sc.D. John Hopkins School of Health and Public Health; Dr.P.H. Harvard University; several years' experience as laboratory instructor and research associate; desires position as epidemiologist or teacher of public health and parasitology. M-263

Young man, S.B. Massachusetts Institute of Technology; 6 months' experience as assistant areal supervisor and engineer; desires position as field worker. Available now. M-264

Woman physician, M.D. Indiana University School of Medicine; 13 years' experience as the director of child hygiene in a state department of health, experience in adult education both as a teacher and administrator; desires position in health education or child hygiene. M-249

Woman physician, M.D. Boston University, Graduate work in health education in Columbia University and Massachusetts Institute of Technology; ten years' experience in child hygiene, psychiatry and with delinquent women; desires a position in school, college, child welfare or institutional work. M-248

Young woman, Ph.D. Columbia University; considerable experience in the field of health education with official, voluntary and commercial organizations; is interested in a position as Director of Public Health Education in a city, state or agency. *Available September 1. M-255*

Opportunity

Sanitary Engineer, to develop plumbing code and to direct plumbing inspection activities. Permanent tenure. Salary, $4,200 a year. For details, apply immediately to the Detroit Civil Service Commission, 15th Floor, Water Board Building, Detroit, Mich.

Persons with medical and post-graduate education who are seeking employment are invited to communicate with the Executive Secretary in regard to several available opportunities.

Where no other address is given excepting the key number, address your replies to the American Journal of Public Health, 50 West 50th Street, New York City, indicating clearly the key number on the envelope. Your replies will then be forwarded.

American Journal of

Public Health

And *The Nation's Health*

Volume 26 — September, 1936 — Number 9

Sero-Diagnosis of Syphilis

WEBB and SELLERS

Health Work in Hawaii

HISCOCK

Dish Washing

KROG and DOUGHERTY

Mastitis

ROSELL

Preliminary Program

Sixty-fifth Annual Meeting, New Orleans, La., October 20-23, 1936

Meeting Headquarters, Municipal Auditorium
Residence Headquarters, Hotel Roosevelt

Published by the

American Public Health Association

374 Broadway, Albany, N. Y.
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American Journal of Public Health

and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 26 September, 1936 Number 9

CONTENTS

Continued on page vi

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Readers' Guide in your library.

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Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 50 West 50th Street, New York, N. Y.

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BELL TELEPHONE SYSTEM

Continued on page viii

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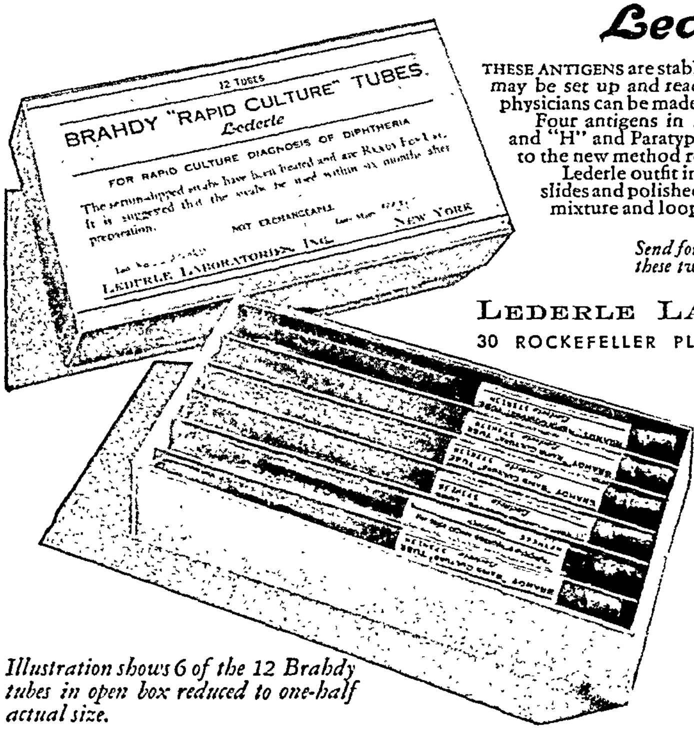
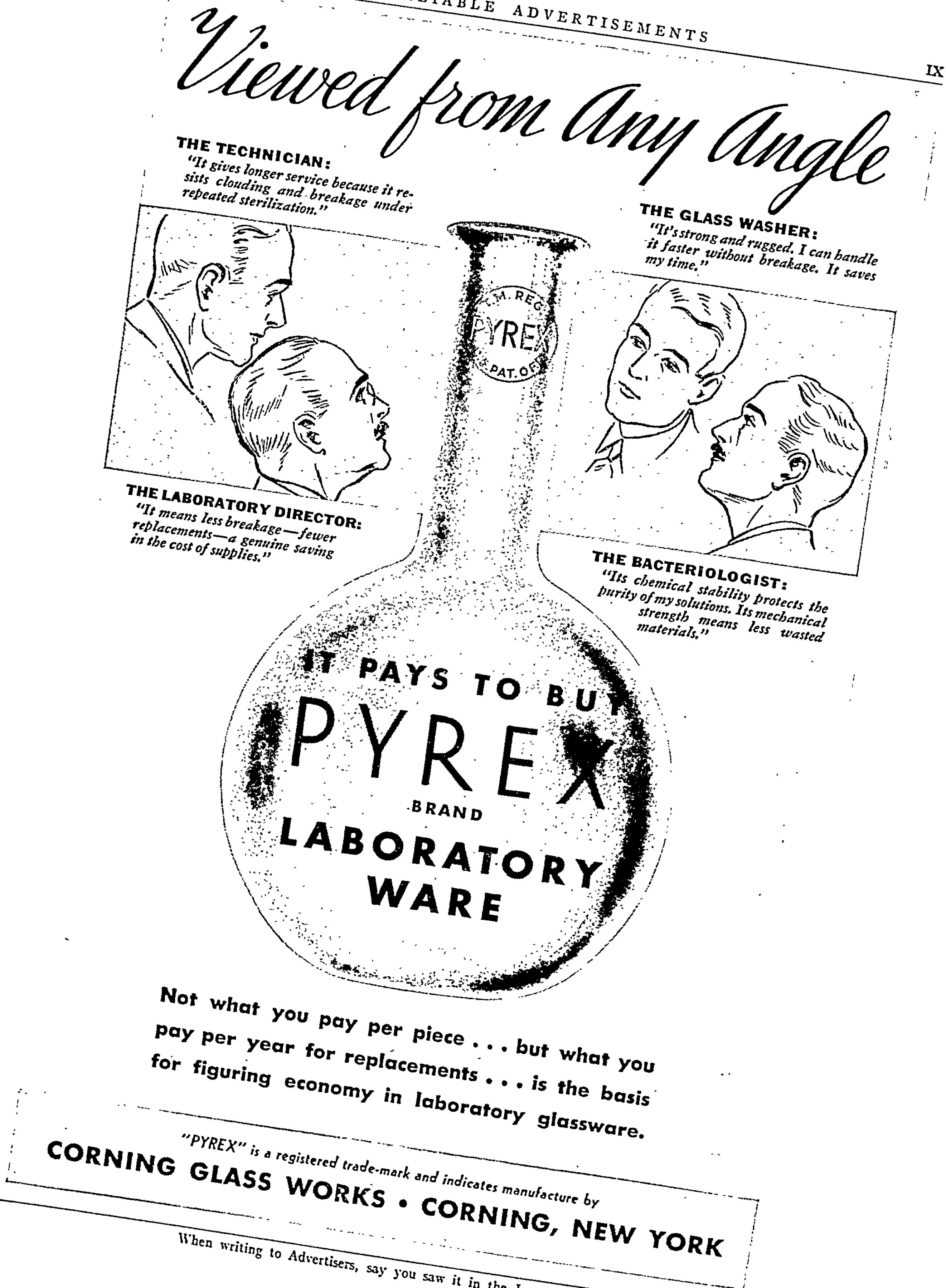


Illustration shows 6 of the 12 Brahdy tubes in open box reduced to one-half actual size.

Contents—Continued **PAGE**

INDEX TO ADVERTISERS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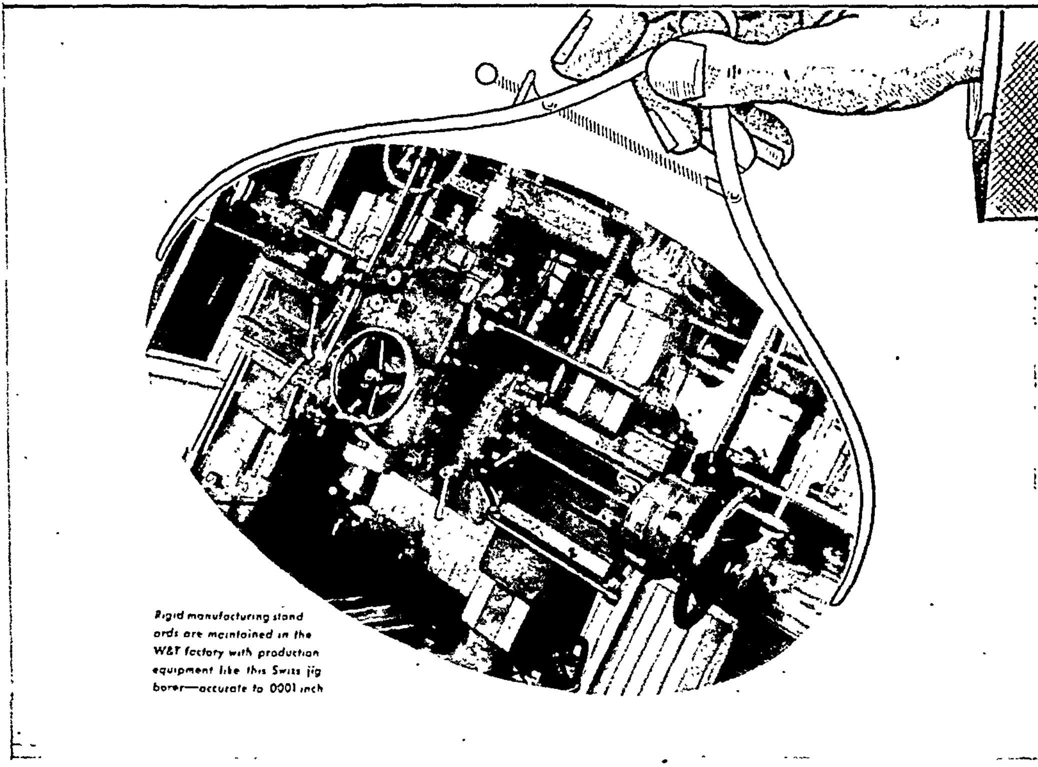
MEETINGS OF AFFILIATED SOCIETIES

and A. P. H. A. Branches

Society	*Secretary*	*Place and Time of Annual Meeting*
Connecticut Public Health Assn.	Ira V. Hiscock	May, 1937
Florida Public Health Association	S. G. Thompson, D.P.H.	Tampa, Dec. 7–9, 1936
Georgia Public Health Association	M. E. Winchester, M.D.	To be announced
Massachusetts Public Health Assn.	G. Donald Buckner, S.B.	Boston, Jan. 28, 1937
Michigan Public Health Association	Marjorie Delavan	Lansing, Nov. 11–13, 1936
Missouri Public Health Association	Dr. C. F. Adams	Columbia, Oct. 1–3, 1936
New Mexico Public Health Assn.	Paul S. Fox	To be announced
Northern California Public Health Association	Dr. I. O. Church	To be announced
Ohio Federation of Public Health Officials	W. D. Bishop, M.D.	Columbus, Nov., 1936
Pennsylvania Public Health Assn.	J. M. J. Raunick, M.D.	Harrisburg, Pa., Sept. 17, 1936
South Carolina Public Health Assn.	Laura Blackburn	To be announced
Southern California Public Health Association	Charles W. Arthur	To be announced
Texas Public Health Association	Lewis Bracy	Kilgore, Oct. 13–16, 1936
Virginia Public Health Association	B. B. Bagby, M.D., Pres.	To be announced
West Virginia Public Health Assn.	John Thames, M.D.	Wheeling, Oct. 12–14, 1936
Southern Branch, American Public Health Association	G. Foard McGinnes, M.D.	Baltimore, Md., November 17, 18, 1936
Western Branch, American Public Health Association (joint meeting with Canadian Public Health Association)	William P. Shepard, M.D.	Phoenix, Ariz., April, 1937

SAVING TOMORROW'S TAX DOLLAR



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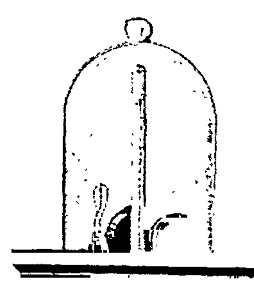

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Health Work on a Sugar Plantation in Hawaii

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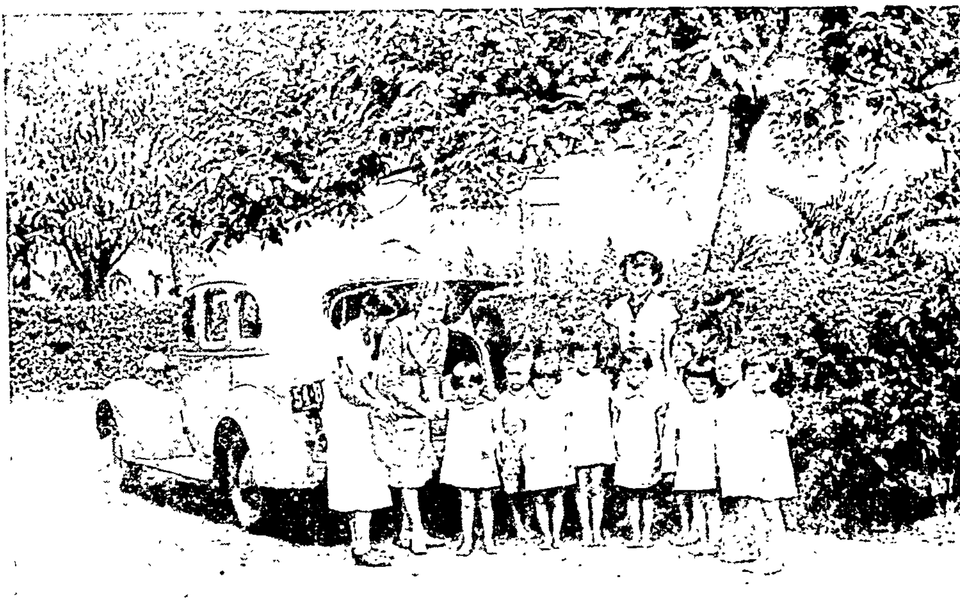
HAWAII was blessed with many resources which enrich the life of her people; but the modern comforts and scientific benefits so abundantly provided are results of the vision, energy, and careful planning of community leaders. Although the Hawaiian Islands, in the mid-Pacific, are 2,000 miles from their nearest neighbor, California, they compare in progressiveness with the most advanced communities on the mainland. The sugar plantations render a valuable medical and welfare service which is gradually expanding to embrace the essential features of public health.

The achievements in the promotion of health and the reduction of preventable diseases are an illustration of the progress in Hawaii. The quality of medical practice is in general high, and excellent hospital and clinic facilities are available. Through the activities of the Territorial Board of Health, with the coöperation of many official and voluntary agencies, smallpox has become a medical curiosity; typhoid and tuberculosis have been greatly reduced; and diphtheria is well on the way to control. Over 60 per cent of the preschool children have been given prophylactic injections against diphtheria in this Territory of some 400,000 people, and there was not a death from this disease during the fiscal year 1934-1935. The tuberculosis death rate has dropped from over 200 in 1920 to an annual average of under 100 for the past 5 years. The infant mortality rate in the Territory was 65 for the fiscal year 1935, with an annual average rate of 82 for the previous 5 years. The average birth rate for the period 1929–1933 was 28. There is considerable variation in the birth and death rates according to race. Hawaii has become a "melting pot" of races and nationalities, as the islands are relatively free from racial prejudice, and natives and immigrants have intermarried, freely.

Hawaii is the first Pacific outpost of America's health defense, and public health work there is of extreme importance to the rest of the United States and to the Army and Navy forces.*

* On the island of Oahu are several important Army posts, including Schofield barracks, the largest Army unit in the United States, and an important Navy station at Pearl Harbor, adapted for expansion as needs arise.



A plantation visiting nurse inspecting children. The doctor and nurse advise the mother regarding diet, clothing and general care.

With the development of an air route to the Orient, bringing Honolulu within 17 hours of the mainland, our interest is stimulated.

PLANTATION SERVICES

Nearly half of the people in the rural sections of the islands (outside the cities of Honolulu and Hilo) and nearly one-third of the total population live on 39 sugar plantations. In 1934, there were over 105,000 employees and their families living in some 20,000 plantation houses. Each plantation employee receives free housing for himself and family, including water and fuel for domestic purposes, besides medical care and community services. The building programs of many plantations cover houses of the one-family type, with bathroom and flush toilet, each located on a lot sufficiently large for a vegetable garden and other home activities. Some $6,500,000 have been expended on new housing during the past 10 years, besides a similar amount for reconstruction of existing homes. Good living conditions and medical care are regarded as important and are reflected in the health and morale of plantation communities.

The employees and their families on each plantation constitute a distinct community. Almost all of the plantations own and operate modern hospitals with medical and nursing staffs. Those which do not have their own hospitals arrange for medical service with a hospital within a reasonable distance. The plantation physician is also appointed by the Territorial Board of Health as a government physician, and directs public health activities within the plantation community, besides serving as registrar of vital statistics and school physician for the district of which the plantation is a part. Each plantation submits a monthly health and medical record to the central office of the Hawaiian Sugar Planters' Association showing basic statistics of births, deaths from important causes,

cases of illness by principal causes, and medical and surgical services rendered. These data are summarized, and a tabular record is returned to the plantations.

As an example of the scale on which this work is carried on, in 1934, 8 plantations on Oahu having a population of 37,658 persons, spent for operating the free medical, hospital, and public health services a total of $206,927, in addition to $175,955 for sanitation and various other public services.

WAIALUA EXPERIMENT

On the invitation of the manager of the Waialua Agricultural Company, a special study of health conditions in the Waialua district was conducted during the summer of 1935.* This study illustrates the health problems of the plantations and opportunities for future development. It is customary for the plantations to conduct through the H.S.P.A. experiments for the improvement of business methods or of welfare conditions, such as housing, and for this purpose one or more plantations are selected. If an experiment on one plantation offers practical suggestions for advancement, the plan is generally adopted by the others. On the Waialua plantation, an experiment is in progress to determine the best methods of improving the economic and social conditions of the people in a typical rural district, so that these people will prefer to live in this rural district rather than in the city. The experiment is being conducted through a comprehensive organization of the community known as the Waialua Community Association, of which some 20 organizations in the district are members.

* Appreciation is expressed for the assistance received during the course of this study from John Midkiff, Manager, and Dr. A. L. Davis, Physician and Surgeon of the Waialua plantation, and from Dr. Frank Midkiff, Director of the Community Association.

The area of Waialua is about 200 square miles, the village being located in the center of a U-shaped coast line. The activities of the district are agricultural, the chief products being sugar cane and pineapples. In addition, there are incidental crops of bananas, vegetables, avocados, besides some raising of poultry and swine. There is considerable subsistence fishing off shore. The cane and pineapple lands are under corporate control. There is practically no homesteading or small farm ownership of these valuable lands, which constitute the basic natural resources of the district. Most of the water is similarly controlled, being both impounded in great gulch reservoirs and pumped from artesian wells.

HOSPITAL AND STAFF

The hospital has a capacity of 36 beds and includes a dispensary. The hospital staff consists of the plantation physician, 2 graduate nurses, one of whom spends about 80 per cent of her time in field visits (for welfare and public health purposes), a nursing assistant and interpreter, 5 attendants, and a clerk assistant. Two camp policemen make sanitary inspections in addition to the attention given to sanitary problems by the field nurse. Consideration is being given to the employment of another field nurse with special training in public health.

The Territorial Board of Health staff coöperates in the public health work of the plantation and provides nursing, baby conference, tuberculosis clinic, and inspection service for the outside area. The Department of Public Instruction directs health education and dental work in coöperation with the Board of Health.

THE PEOPLE

The people of the Waialua Agricultural Company represent approximately one-half of the population

TABLE I

POPULATION OF WAIALUA PLANTATION ACCORDING TO RACE, SEX, AND CHILDREN

Race	Total			Ratio Men to Women	Per Cent		
	Men	Women	Children		Men	Women	Children
Filipino	906	139	962	7:1	53	21	55
Japanese	516	313	382	1.6:1	30	49	22
Portuguese	119	105	195	1:1	7	16	11
Korean	42	29	96	2:1	2.5	4.7	5.5
Anglo-Saxon	40	31	45	1.3:1	2.5	4.8	2.5
Porto Rican	23	18	48	1.3:1	1.5	3.0	3.0
Others	38	15	30	2:1	3.5	1.5	1.0
Total	1,684	650	1,758	2.6:1	100	100	100

residing in the Waialua District. In the Waialua District as a whole, which is the fifth precinct of the fifth representative district, in 1930, there were 8,129 persons, of whom 5,210 (64 per cent) were males, and 2,910 (36 per cent) females. The plantation census as of June 30, 1934, showed a population of 4,461, of whom 3,310 were living in family groups and 1,151 were single. On the basis of 616 families, there were 5.3 persons per family. A total of 470 men, 248 women, and 1,797 children were classed as citizens.

The plantation census of February 11, 1935, revealed 4,092 persons in the villages of the company. Of these, 1,684 (41 per cent) were men, 650 (16 per cent) women, and 1,758 (43 per cent) children. The wives numbered 510.

The population was divided as to race as shown in Table I.

The public health problems of a

Plantation doctor and nurse receiving the laborers and members of their families at one of the village dispensaries.

From Ewa Health Center Report. Kindness of Castle & Cooke, Ltd.

A corner of the nursery at a plantation health center. Mothers who work for the plantation have the privilege of leaving their babies under a trained attendant during the day. A nominal charge is made for food only.

community with the above composition are somewhat different from those of the average city, county, or district because of the large proportion of men of young and middle age, together with a fairly large number of young children.

The 1,066 houses on the plantation have an average of 2 bedrooms each, varying from 1 to 4. Most of the water supply is derived from artesian wells, with public connections to the houses. There are 38 cesspools, 90 septic tanks, and 880 privies. Plans for sewage disposal for the new homes are being developed in coöperation with the Territorial Board of Health. The milk supply is obtained from a tuberculin tested herd of a modern dairy, where consideration is being given to pasteurization.* Considerable canned milk is used by plantation families. Milk is furnished to laborers in the field during harvesting time, and to the schools and kindergartens.

HEALTH RECORD

During the years 1933 and 1934, there were 191 births in the district, of which 103 occurred among plantation personnel. During the first 7 months of 1935, 64 per cent of the plantation births occurred in hospital as compared with 50 per cent in 1934, and 42 per cent in 1933. Deliveries by an "informant," which were especially common among Filipinos, have shown a marked decrease in favor of hospitalization. But both the Filipinos and Japanese frequently employ midwives. For several years the plantation physician, the nurse, and the interpreter have stressed the importance of proper care at time of delivery, and

* It is noteworthy that 4 of the plantations on the island of Kauai have provided pasteurized milk for their employees.

their efforts are bearing fruit. The birth rate is very high among these families, one-third of the wives having been confined within a recent 19 month period, the proportion being nearly 50 per cent for the Filipinos and Porto Ricans.

Among the plantation population, during 1933 and 1934 there was an average of 24 deaths each year, 16 of which were of infants under 1 year of age.* Deaths of infants among Filipinos are abnormally high, due to causes associated with early infancy and feeding. In contrast, the Japanese, with a similar number of births, have a highly favorable rate. During 31 months, the infant mortality rate for the plantation was 85 (44 neonatal), the rate for the Japanese being 19; for the Filipinos, 185.

A study of the deaths from all causes on the plantation indicates that the leading causes which offer most opportunity for additional public health work are those related to early infancy, gastroenteritis, beriberi, pneumonia, and tuberculosis. The last two are problems of considerable importance among the laborers themselves, while the others relate to the health of their families and have both a direct and an indirect influence on the work of employees. The absence of deaths from acute communicable diseases of childhood since 1931 is noteworthy. There was no death of a child of school age from any cause during 1932–1935. Most of the preschool children have been given prophylactic injections against diphtheria and smallpox vaccination, and many of the plantation personnel have been given anti-typhoid vaccine. It is proposed to give anti-typhoid vaccine to families routinely upon employment. The problem of nutrition and feeding stands out prominently as a factor in the impressions gained from both morbidity* and mortality rates. Furthermore, in view of the health and welfare problems, consideration is being given to the furtherance of contraception and sterilization measures where indicated in individual cases.

Tuberculosis is recognized as an important industrial and public health problem, especially among the Filipinos and Hawaiians. In 1935, there were 35 known cases and 135 contacts among plantation personnel, with 12 new cases hospitalized. One of 2 chest clinics operated in the district is for plantation personnel. A tuberculosis survey of 7th grade school children was conducted in 1934–1935 in coöperation with the Board of Health. Of 200 children (chiefly plantation) given tuberculin tests, followed by X-ray examination of positive reactors, 1 was found to have tuberculosis and was admitted to the sanatorium. Two other children were classed as suspicious and placed under active medical and nursing supervision.

The plantation physician conducts laboratory work at the hospital, in addition to the examinations of milk and water and diagnostic specimens by the Territorial Board of Health.

Prenatal medical supervision is given to over half of the cases of pregnancy by the plantation physician who also conducts child health conferences at 3 camps. In addition, children are weighed at home in connection with nursing advisory visits.

There were some 1,600 school children in the entire Waialua district at the time of the 1934–1935 census. The plantation physician examines all entering school children each year, vaccinates any children not previously

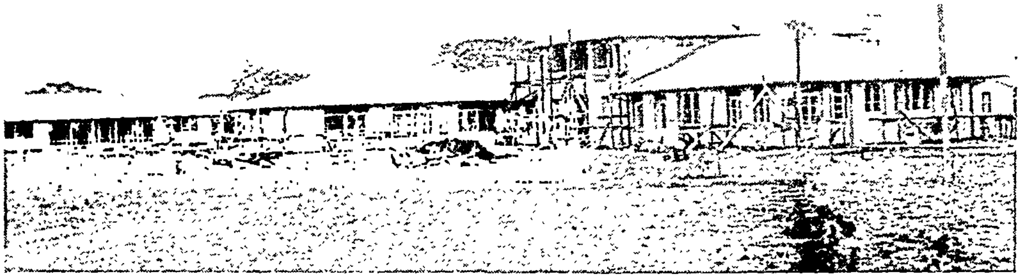
* In 1934, there were 6.1 deaths per 1,000 population, the rate for 38 plantations being 6.5. The rate for Filipinos was 9.1.

* In 1934, there were reported to the plantation physician 209 cases of communicable diseases, besides 36 cases of diarrhea and enteritis (23 under 2 years), 2 cases of beriberi, 25 cases of pneumonia, and 144 cases of other acute respiratory illnesses.

protected, and examines children referred by the teacher or nurse for special purposes. School nursing is rendered by the Board of Health nurse in the district.

SUMMARY

The Hawaiian Sugar Planters' Association and the individual companies recognized many years ago the value of attention to the health and welfare of the employees and their families. The Waialua Agricultural Company, Ltd., has studied the health, education, and welfare problems of the people living on the plantation with a view to future program planning. The people of the plantation are fortunate to have the benefit of a complete medical treatment program, including free diagnostic and hospitalization service. A new hospital will soon be erected, and the public health nursing service will be extended in coöperation with the Board of Health. Meanwhile a comprehensive education and recreation program is being developed in which health education will play a prominent rôle.



New sugar plantation hospital with modern facilities. Waialua Agricultural Company, Ltd.

Emancipation of Women

NOW may we turn to athletics and physical culture. For some years I have been investigating the effects of athletics on women and I am convinced of two things: (a) that physical exercise is as good for women as it is for men; (b) that excessive exercise is more harmful to women than to men. The difficult point to determine is where to draw the line. In recent years girls have been increasingly encouraged to take up different forms of exercise, and there is every indication that the Government intends to foster this movement. It therefore becomes increasingly important to have clear and definite ideas as to what is good and what is harmful. It must of course be axiomatic that nothing can be good for a girl's body which renders her less capable of motherhood. So far as I have been able to discover athletics are no more likely to cause heart trouble or any extra genital physical disability in women than in men. I am further of the opinion that exercise by itself has no harmful effect on childbearing. The idea that over-development of the abdominal musculature is disadvantageous is the direct contrary to the truth. The important points which remain to be determined are whether violent exercise exerts any effect on the development of the uterus or on subsequent fertility.—Geoffrey W. Theobald, M.D., Some Effects of Emancipation on the Health of Women, *J. State Med.*, XLIV, 6 (June), 1936.

Practical Methods of Testing for Mastitis

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"THE highly developed mammary organ of dairy cows is particularly liable to a number of diseases which are less common in the types of cattle in which selective breeding has not been so intensively directed toward udder refinement and functional capacity." "Streptococcic mastitis, the most common and formidable of udder infections, a chronic insidious and readily transmissible disease, usually results in serious permanent udder impairment." These quotations from Leunis Van Es tell nearly all we know of the etiological factors of the prevalent type of mastitis of cows.

The study of this important type of mastitis which affects approximately one-third of the actual milk production, begins with Nocard and Mollereau in 1884,[1] followed by workers from all countries where dairying is an important industry. The results presented in this discussion have been collected over a period of 10–15 years in Germany, Austria, Spain, and later in Canada and the United States. The author[2] presented the first description and report on this continent of *Strepto-cocci agalactiae* being found as the etiological agent of mastitis in Canada, together with the description of many of the methods actually used for the detection of this disease.

The publications on this disease during the last 10 years discussing its frequency, economic importance, diagnosis, etiology, prevention, and treatment are considerable. Of the more comprehensive studies of the disease, reference should be made to the work of Seeleman,[3] Klimmer and Haupt,[4] Rosell,[5] Whalley,[6] and recently Petersen and McCaster[7] containing a bibliography of more than 2,000 papers, Arne Hansen,[8] Hopkirk,[9] and also Steck.[10]

In this paper only a summary of the methods in general used for detecting the disease will be discussed.

The great number of publications on this question during the last 4–5 years, with diverse and opposing opinions, may bring confusion and cast doubt on the diagnostic value of the different tests proposed. In reality the diagnosis is not as difficult as might appear from the academic rather than practical discussions over the relative efficiency of these diagnostic methods. There may be some difficulty in understanding the etiological mechanism of this form of mastitis, but by the study of the physio-pathological or functional symptomatology there has been found the basis which permits the accurate diagnosis of nearly every case of the disease. This is accomplished by testing the function of the gland through the milk. Also physical examination affords the basis for an anatomical or clinical

diagnosis in very many cases if the infection is followed by anatomo-pathological changes, noticeable by expert manual palpation.

METHODS OF DIAGNOSIS

The following discussion deals with establishing the basis for an efficient diagnosis of every case of mastitis, since one of the main objects of the examination of cows from the public health standpoint is to detect every diseased, or better, every infected cow, which could be a source of infection for other animals or for man.

Three bases may be used for the diagnosis of pathological changes in the mammary gland, *viz.*, (a) the presence of the organism, which may be pathogenic for animals or men—this may not mean mastitis in the sense of considering as diseased only those cows showing clinical evidences; (b) the functional alteration which means secretion of abnormal milk, which ordinarily means mastitis in the ordinary clinical concept of the disease; (c) determination of the existence of anatomopathological changes perceptible by physical exploration which permits the detection of an anatomical form of mastitis, of the active type if accompanied by histological reactions. In other cases anatomical changes may be the cicatrices of a completely cured mastitis of no importance to public health or to farm prophylaxis; or else an idiopathic hypertrophy of the connective or mesenchymal tissue.

From the standpoints of public health and animal hygiene, which cannot be separated one from the other, the detection of the infection (a), as well as functional alteration (b), are the most important. The physical examination (c) is also a very important aid in diagnosis, if taken with its natural limitations. It should not in itself be accepted as a diagnostic procedure but should be considered in its relation to presence of infection and the secretion of abnormal milk.

RELATIVE VALUE OF DIAGNOSTIC METHODS

On reading the many publications on mastitis which have appeared in the last 4–5 years, it seems difficult to obtain a concrete opinion on the relative value of the methods of diagnosis from any of the concepts concerning mastitis, especially as to etiology, diagnosis, and therapy. Opinions of authors in this respect vary widely. This may be attributed in part to different findings, and to the possibility that different types of the disease may be present in different countries and circumstances. However, the results of the leading dairy bacteriological and veterinary institutions of this country and abroad are in complete or near accord, at least as to the diagnostic points of the disease. This concordance is especially obvious in the results of the institutions of the European countries, particularly those obtained in Germany, Switzerland, France, Austria, Scandinavia, and Denmark, where the problem of chronic streptococcic mastitis has been studied since 1910. These results are also very similar to those recently published by some important English, American, and Canadian institutions.

The estimate of the value of the various methods discussed in the present survey is based on results obtained in the above institutions in many of which the author has had the opportunity of working; and also on results secured during 8 years in this department and 4 months in the Bureau of Animal Industry in Washington, in cooperation with Dr. W. T. Miller.[11] The results confirm in most essential points those of the important milk institutions to which I have referred.

Bacteriological methods—Reference is made especially to the streptococcic or micrococcic forms of mastitis which

constitute the ordinary type of udder infection which are considered nearly exclusively in the mastitis campaigns at present going on in all countries. The more occasional infections of the udder (tuberculous, staphylococcic, colic, pyogenic, bacilloses, actinomytic, etc.), and also infections with the so-called *Streptococcus epidemicus* or beta hemolytic infection of the udder pathogenic for man, are not considered in this survey. The diagnosis of these is based upon the same methods or principles as those used for agalactiosis, or the *Streptococcus agalactiae* form of mastitis which, from a clinical standpoint, may often be present in an acute form.

Although in many cases the microscopic or cultural examination may be positive without other evidences of infection, the positive finding of the organism supposed to cause streptococcic mastitis or agalactosis should be one of the principal objectives of milk examination.

Besides the ordinary culture on blood or nutrient agar, some special methods are used for a better cultivation of *Streptococcus agalactiae* *i.e.*, the Klimmer serum-alkali-albuminate-saccharose brom-cresol purple agar plates [12]; Edwards [13] glucose 5 per cent serum agar containing 1:200,-000 crystal violet to prevent growth of staphylococci, or 0.1 per cent blood asculin 1 per cent Lenko agar containing crystal violet; or Bryan's [14] liver infusion broth agar containing 1:110,-000 brilliant green or gentian violet; and the Steck milk serum-dextrose deep agar method in special test tubes.[15]

For the technic of these methods and other questions of bacteriological testing, reference should be to the original papers or to other publications given in the attached bibliography. The author [16] earlier discussed many of these problems of testing for mastitis.

It should be stated here the Streptococcus connected with mastitis was first described by Nocard and Mollereau in 1884 [1] with all the precision that was possible at that time. Later, in 1890, it was described by Guillebeau and Hess,[17] and in 1894 as *Streptococcus agalactiae* contagion by Kitt.[18]

Since that time, the names *Streptococcus mastitidis* and *Streptococcus agalactiae* have been used interchangeably for this species of streptococcus. The characteristics given by Bergey [19] do not agree with those for 15 years universally accepted as typical for this streptococcus, which never ferments raffinose or inulin and very seldom mannitol; nor does it give a yellow surface fluid in litmus milk as stated by Bergey.

Cultural differentiation of *Streptococcus agalactiae* from closely related types is not difficult. The most important cultural characteristics of *Streptococcus agalactiae* or *Streptococcus mastitidis* are its ordinary flocculent aspect with clear supernatant media in lactose nutrient broth, and its non-beta hemolytic properties, and with generally an alpha, alpha prime, or gamma type of hemolysis. This streptococcus never produces a typical hemolysis of the washed blood corpuscles either under aerobic or anaerobic conditions, or the hemolysis in blood disk agar test described by the author, which consists of placing a small disk or piece of blood agar in a 15–18 hours old serum broth culture and incubating for 24 hours. In regard to hemolytic tests, the differences of opinion based on the work in different laboratories, may be due to the dissimilar technics and interpretations, as I have recently observed on a visit to many European institutions. Some even considered as a beta hemolytic those forming the smallest clear zone of less than a millimeter in diameter around colonies.

Other more important cultural char-

acteristics of *Streptococcus agalactiae* are a typical acid coagulation of litmus milk with sometimes a small reduction of the litmus at the bottom of the tube in 18–28 hours although ordinarily no reduction is apparent, no curdling of milk containing 1:20,000 of methylene blue; ability to hydrolyze sodium hippurate in 4–6 days; a final H-ion concentration of below pH 5.0 in glucose or lactose broth after 5 days, and a fermentation of sucrose, lactose, maltose, salicin; but not of mannitol, raffinose, arabinose, or inulin. These are the most important cultural characteristics which differentiate this type of bovine from all other streptococci. In a study of more than 400 strains isolated from separate quarters of diseased udders in Canada and at the Bureau of Animal Industry in Washington,[11] and in a comparative study of 208 strains of human, animal, and milk streptococci made at McGill University, it has been found easy to differentiate clearly between the *Streptococcus agalactiae* and other streptococci although strains giving some atypical cultural reactions were often encountered.

For the bacteriological test in mastitis, microscopic examinations of smears, especially those made from individual samples, aseptically taken and incubated, or, better, from centrifugated incubated samples, is often sufficient. The presence of leucocytes in numbers ranging approximately over 200,000 per c.c. of milk (1 in every 2 fields of 0.16 mm.) should make one suspect mastitis. This is in accordance with Udall and Johnson,[20] Ernst,[21] Hucker, Trudel, and Jennings.[22]

For streptococci to be found on a smear it is necessary that a relatively great number of chains be present in the milk, or that an impracticable amount of time be employed for their detection. In order to find a chain of streptococci in 100 fields, there must be, according to Steck,[15] at least 2,000 chains in 1 c.c. of milk. Culture offers a greater possibility of positive finding, but unfortunately streptococci are not detected by a single examination in all cases of streptococcic mastitis. The chances of culturing streptococci depend on the number present in milk and their biological condition. In using a loop of milk spread over an area of 2 mm., there should be at least 1,000 organisms in 1 c.c., all capable of growth in order to obtain 2 colonies and, in addition, the organisms must be equally distributed through the milk.

The etiological cause of the disease may not be found in diseased quarters on some days or periods of the disease, or even in some part of any single milking, and, in addition, they may be found occasionally in udders without any demonstrable functional or anatomical abnormality.

The functional diagnosis—The functional diagnosis, or the study of the physio-pathological alterations or disturbances is very much more efficient than the anatomical or even histopathological, diagnostic considerations.

In view of the fact that the functional diagnosis of mastitis, or the testing of its physio-pathological alterations or abnormalities, affords a more certain method of detecting the disease in its different degrees of intensity, than the anatomical examination does, this functional diagnosis should have preference, though the physical examination of the udder must not be neglected.

The detection of the inflammation of the udder through its functional disturbances by means of the many biological, chemical, physical, or physicochemical tests developed in the last 20 years, has the advantage of revealing the disease in many cases before the anatomical changes may be noticeable, at least by exterior examination, and even before histological changes may be perceptible. This functional diag-

nosis has also the advantage of measuring to a certain extent the degree of the disease, and even of approximating the border line between normal and pathological, which is still a matter of discussion. Also, only with the physiopathological diagnosis is it possible to differentiate between a carrier without mastitis and a diseased udder.

The functional diagnosis of mastitis is made by the determination of the abnormality of the milk or udder secretion; by testing the milk with test substances which will detect any change in its quantity and composition, depending upon whether the gland is normal or diseased or even in certain cases upon the general condition of the cow to which the gland gives a reflection as shown by Little and Jones.[23]

In mastitis not only is the quantity of milk reduced, but the quality is changed in chemical, biological and other aspects. The most commonly used tests for mastitis are based upon the determination of some of these alterations, the most important of which are given in the order in which we believe they can be most readily utilized for a practical and rapid diagnosis: (1) chloride increase detectable by field or laboratory tests; (2) catalase increase, detectable by field or laboratory tests; (3) decrease in H-ion concentration, detectable by field or laboratory tests; (4) cell increase, demonstrable by the leucocytic examination or by the microscopic sediment test; (5) diminishing of the sensibility to rennin, and appearance of soft curd; (6) presence of streptococci or pathogenic bacteria in incubated or non-incubated aseptically taken milk samples; (7) lactose decrease demonstrable by field or laboratory tests; (8) presence of clots as shown by the black cloth filter or strip cup tests; and (9) visible abnormalities or changes in the milk.

Other alterations in the milk which are not of as much practical importance for diagnosis are: fat decrease; effect on character and amount of casein; increase in heat coagulable albumin; decrease in solids not fat; decrease in specific gravity of serum; decrease in amount of ash; decrease in calcium and potassium; increase in sodium; decrease in electric conductivity; decrease in viscosity, and increase in per cent of water.

From the above outline we can see that milk substances elaborated by the glandular cells are decreased in the diseased udder, while those due to inflammatory reactions (chloride, leucocytes, catalases, etc.) are increased. The chemical and biological tests should be considered as more practical and effective for diagnosis than the bacteriological procedures.

All tests, especially the chemical and biological, give their best diagnostic results when employed on the milk of individual cows, preferably milk of separate quarters, and in fresh milk, except the chloride test which can be used in old milk.

Chemical alterations cannot be detected so well by studying the mixed milk of the 4 quarters as by testing the milk of each quarter, as frequently only 1 or 2 of the quarters may be infected. Because of this, diagnosis on mixed milk cannot be taken as definite. Although it is very important that the tests be carried out on the milk of each quarter separately by the use of certain tests, mastitis may be detected in some cases in mixed milk, if this milk contains approximately 10 per cent of milk from diseased udders.

One of those listed as the more efficient tests may suffice, if clearly positive, to establish the diagnosis, but no one alone is 100 per cent efficient, and the accuracy of the diagnosis increases by using simultaneously 2 or 3 tests.

Other biological and physico-chem-

ical tests have been given to differentiate normal from abnormal milk secretion as: freezing point depression; refractometer index; simplified molecular constant; and also, as a more or less indirect bacteriological test, the reductase test and certain serological tests, such as agglutination, complement test, etc. Many enzyme tests such as per cent of amylase, peroxydase, and the retarded rennet coagulation have been recommended.

For rapid and efficient work, the order in which it is recommended to proceed to test a herd for mastitis, including every quarter, is the following: (a) pH with brom thymol blue; (b) rapid catalase with 9 per cent hydrogen peroxide; (c) rapid chloride test, and after or before this test, (d) the black sieve cloth test, and (e) palpation and clinical examination of the udder.

With these 5 tests, but especially with the first 3, it is possible to find all, or nearly all, the diseased cows; and one person alone, or with a helper, may test in this way approximately 15 cows per hour.

After these tests, samples should be taken from the doubtful and such other cows as may be desired and more extended laboratory tests made. The comparative quantity of milk in different quarters by milking out and measuring should also be determined.

The samples for bacteriological examination should be taken aseptically, immediately cooled, and kept on ice. The technics for the tests, especially those of more practical value, as the pH, catalase and chloride, are given in a great number of other publications, and also have been summarized [14] in an earlier discussion.

The comparative value of the biological or chemical tests has been widely discussed with nearly unanimous agreement among many institutions, and dissent among many others.

These opinions can be summarized as follows:

The catalase and chloride tests are the most effective in finding cases of diseased udders according to function: we may say 98 per cent of the cases, if used simultaneously. The pH appears capable of detecting 80–85 per cent of diseased cows in some herds, especially if repeated on different days and hours, but in certain herds the per cent of detection by this method may be somewhat less.

With the simultaneous use of these tests, repeated if necessary in doubtful cases, it is possible to detect nearly 100 per cent of the diseased cows, even those only slightly diseased, although the exact border between the normal and pathologic has not yet been established.

The leucocyte count, and especially the bacteriological test, may give the lacking information in some special cases. The black cloth sieve test is useful only for cases where abnormal visible particles are present, which is not more than 10–20 per cent.

These tests may confirm the clinical examination or palpation test. Sometimes an abnormal palpatory finding, may be present without demonstrable infection. In these cases only the functional diagnosis can decide the existence of physio-pathological disturbance of the active disease.

The clinical or external examination—The importance of clinical examination is very great for many forms of mastitis. It includes history, all possible exterior examinations and observations on the general health of the cow, glandulary infarct, edema, local sensitiveness of the udder, and visible changes in the milk. Some changes in the milk can be detected by taste. The most important of all these clinical explorations is the skilled superficial and deep palpation after the quarters have been completely milked out.

The udder examination, although requiring more time because of the necessary emptying of the udder, should, if possible, be practised in every field test for mastitis.

The value of the physical examination is sometimes exaggerated, and it would do great harm for diagnosis and the detection of the greatest number of cases of mastitis if it were considered alone sufficient. Palpation should never be considered equal in diagnostic value to the combined bacteriological and biological tests or even alone, or to the biological or functional tests which are indisputably the most efficient methods of diagnosis at our disposal.

In the testing, during 8 years, of some thousands of healthy and diseased quarters, most of them examined physically at some time by the same principles of palpation used for many years in human medicine, the impression has been gained that it can never give the definite diagnosis obtained by biological and bacteriological testing. In studies carried on in the Bureau of Animal Industry with Dr. W. T. Miller,[11] 280 quarters were examined, of which 232 (82.8 per cent) were found to be abnormal. The number of quarters found to be diseased were positive to the individual tests as follows: chlorine test 192 (82.7 per cent), catalase test 167 (78.6 per cent), brom thymol blue test 69 (30 per cent) (in this case the pH value showed less efficiency than in many other circumstances); macroscopic and microscopic sediment tests 137 (69.5 per cent), palpation of the udder 151 (65.6 per cent), and the black cloth test 15 (6.0 per cent). Streptococci were present by only one examination in 94 (41 per cent) of the diseased quarters; they were also present in 10 (21 per cent) of the 48 quarters which failed to react to any of the tests, but in a second test many of these failed to show streptococci. This was the herd of a public institution where the mastitis and also the abortion have been prevalent for a long time.

SUMMARY

In view of the facts given, it is concluded:

1. The palpatory and clinical examination are not able to detect all the cases of mastitis.
2. The biological method of testing is the most accurate for the diagnosis of mastitis.
3. In consideration of the importance for the sanitation of a herd and for a successful campaign against mastitis, correctly used palpation and inspection, although very valuable, should be employed in conjunction with the biological and chemical and, if possible, bacteriological mastitis diagnostic tests.

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American Sewerage Practice

". . . The twenty years which have elapsed since the publication of the second edition have witnessed some striking developments in sewage disposal. The activated sludge process, which was then in its experimental stage, has made great headway and now occupies a foremost place among methods of sewage treatment. The digestion of sludge in separate tanks is now widely practised, and forms the subject, particularly in America, of an enormous amount of research. Of late years there has been a marked revival of interest in the chemical treatment of sewage, and new modes of precipitation have been introduced which, though as yet in the experimental stage, have attracted favourable notice in many quarters.

In the course of the past twenty years the purification of sewage has made great strides in America. In 1915 only 3,900,000 people, 4¼ per cent of the population of the United States, lived in towns provided with sewage works. Treatment, more or less complete, is now given to the sewage of 20,000,000 of the people who inhabit cities having populations of 100,000 or over. From the point of view of the American engineer, the delay in putting schemes of sewage treatment in hand is not without its advantages. He starts with a clean slate, and he has the benefit of all the experience which has been gained in England and elsewhere. Usually too he has a free hand in the design of his works.

The sewage from 16,900,000 people is disposed of by dilution alone, and that from 8,500,000 by fine screening and dilution. The self-purification of polluted rivers has been closely studied in America, and seventy-five pages of the book are devoted to a consideration of the subject in all its bearings. Where sewage is discharged in the vicinity of bathing beaches or sources of water supply, chlorination is usually resorted to."—Excerpt from review in *J. Roy. San. Inst.* (Supp.), July, 1936, of *American Sewerage Practice*—Vol. III. *Disposal of Sewage*, by Leonard Metcalf and Harrison P. Eddy.

Adaptation of a Proposed Standard Methods Medium to General Bacteriological Culturing

Preliminary Report

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THE desirability of using one simple, inexpensive, easily prepared, and readily available basic medium for different types of bacteriological culture work prompted the investigation of the suitability of a proposed Standard Methods milk medium.[1, 2, 3] This medium is composed of 0.5 per cent hydrolyzed casein—Tryptone,* 0.1 per cent glucose, 0.5 per cent fresh skim milk, and 1.5 per cent agar. Casein † and its various digestion products have been used previously in general culture media and for specialized studies of bacterial nutrition, toxin and indol production, and agglutination.

Separate studies were made to compare slight modifications of the proposed milk medium with special culture media in routine use for growing beta hemolytic streptococci, pneumococci and stock cultures and for some miscellaneous culture studies. Individual attention is given each of these subjects below.

BETA HEMOLYTIC STREPTOCOCCI

A comparison of the incidence of growth of beta hemolytic streptococci on tryptone blood agar and peptone beef extract blood agar plates was made with 553 swabs. The swabs used were those received routinely for examination of *Corynebacterium diphtheriae* with a request for an examination for beta hemolytic streptococci. The swabs were streaked first on the routine blood agar plates and then on the tryptone blood agar plates. After 18–24 hours' incubation at 37° C., the plates were examined for the presence of beta hemolytic colonies. Of the 553 swabs used, 113 (21 per cent) showed beta hemolytic colonies on the tryptone agar, and 95 (17 per cent) were positive on the beef extract agar. Seventeen swabs were positive on the tryptone and not on the beef extract, and 3 swabs were positive on the beef extract and not on the tryptone. One culture on the tryptone and 10 cultures on the beef extract were indefinite after 24 hours, and further incubation was necessary before complete hemolysis was observed. The colonies were of equal size on both media and the zone of hemolysis was equally clear.

For this study the original formula of the tryptone medium was modified by the omission of the skim milk and the addition of 0.5 per cent sodium

* Prepared by the Difco Laboratories, Detroit, Mich.
† See bibliography.

chloride. The routine medium was Standard Methods agar with 0.5 per cent sodium chloride. Both media were adjusted to pH 7.4 sterilized at 15 lb. for 20 minutes, and before use 5 per cent defibrinated sheep blood was added to each medium, and the poured plates were incubated 24 hours for sterility.

PNEUMOCOCCI

Specimens received for routine pneumococcus typing were streaked on one tryptone blood agar plate and one Douglas[20] blood agar plate and incubated 18–24 hours at 37° C. The plates were examined for numbers of colonies present, their size, and characteristic appearance. Both plates were then left at room temperature and the appearance of the colonies observed daily for 3 successive days.

The numbers of colonies appearing on both plates were comparatively the same. In several instances the colonies were slightly larger, and in some instances slightly more moist on the tryptone agar, colonies usually remaining more moist at room temperature a day longer.

Pure cultures of pneumococci inoculated into tryptone broth grew well enough in 6 hours to be used for Neufeld typing.

The tryptone agar was modified for this study by increasing the tryptone and skim milk content to 1 per cent each, adding 0.5 per cent sodium chloride, adjusting to pH 7.8. After sterilization 7 per cent defibrinated sheep blood was added, plates were poured, and incubated for sterility.

STOCK CULTURES

A group of 150 stock cultures were transferred from routine media to tryptone agar slants. These cultures had been carried on various media believed to be necessary for optimum growth of certain different species which do not grow readily in ordinary media. No modification of the original formula of the tryptone medium was made but the hydrogen-ion concentration was adjusted for certain fastidious organisms. Sub-cultures from stock cultures that had been stored in the refrigerator from 2 to 3 months were made, incubated at 37° C., and observed at 15, 24, and 48 hours. Good growth was observed after 15 hours, and luxuriant growth after 24, except in the case of one strain of *Proteus vulgaris* which did not grow well at 37° C., but which showed good growth at room temperature.

Following these preliminary observations the sub-cultures were placed in the refrigerator for 3 months, sub-cultured at the end of this period, and observations repeated. All cultures maintained their viability. The following 150 stock cultures were used: *Brucella melitensis* (6 strains), *Br. abortus* (14), *Br. Sui* (7); *Eberthella typhosa* (16); *Salmonella schottmuelleri* (6), *S. aertrycke* (5), *S. enteritidis* (6), *S. suipestifer* (1), *S. morgani* (3), *S. paratyphi* (1), *S. hirschfeldii* (1); *Shigella dysenteriae* (2), *Sh. paradysenteriae* varieties *Army, Flexner, Hiss, Strong, Harris, Sonne* (35), *Sh. alkalescens* (3), *Sh. dispar* (1); *Proteus vulgaris* (19), *P. hydrophilus* (1); *Bacillus anthracis* (1); *Serratia marcescens* (1); *Pasteurella tularensis* (1); *Escherichia coli* (1); *Pseudomonas aeruginosa* (1); *Actinobacillus mallei* (2); *Staphylococcus aureus* (2), *S. albus* (2), *S. citreus* (1); *Streptococcus stenos* (1), *Str. faecalis* (5); *Vibrio comma* (2); *Monilia candida* (2), and *Blastomyces* (unclassified) (1).

MISCELLANEOUS CULTURING

1. *Corynebacterium diphtheriae*—Tryptone broth (tryptone 0.5 per cent, glucose 0.1 per cent, fresh skim milk 0.5 per cent, pH 7.4) was substituted for the nutrient broth in Loeffler's blood serum medium and inoculated

with positive routine throat cultures of *Corynebacterium diphtheriae.* Luxuriant growth was obtained by overnight incubation at 37° C. and morphologically typical organisms were found upon microscopical examination.

2. *Neisseria intracellularis from a suspected case of meningitis*—Spinal fluid submitted for cultural examination was streaked on a tryptone blood agar plate as above referred to in the isolation of pneumococci and the plate was incubated at 37° C. for 24 hours. Typical colonies of *Neisseria intracellularis* were secured. Only one specimen of this type was available.

3. *Mycobacterium tuberculosis*—Six strains of *Mycobacterium tuberculosis* isolated from sputum in 1934 and kept at 37° C. for 13 months on a coagulated egg-yolk medium were inoculated on tryptone glucose skim milk agar slants and incubated at 37° C. Fairly good growth occurred in 5–7 days. Further work on the use of a modification of this medium for the culturing of *Mycobacterium tuberculosis* is being done.

4. *Antigens for Macroscopic Agglutination Tests*—The use of this medium for the production of antigens for use in macroscopic agglutination tests is also being studied and will be reported later.

SUMMARY

The proposed Standard Methods milk medium containing tryptone, glucose and skim milk proved excellent for use in general laboratory culture work. One hundred and fifty cultures of 37 types of organisms grew rapidly and abundantly. Organisms, such as brucellae, pasteurellae, meningococci, and pneumococci which usually are cultured only on special media were observed to grow rapidly on the tryptone medium with slight modification of nutrient material or adjustment of the hydrogen-ion concentration.

The use of digested casein products in bacteriological culture media has been known for several years, and while this simple basic medium is not presented as a solution for all the difficulties encountered in bacteriological culturing, it has been found suitable for many types of routine work as well as for milk plating. Its use eliminates the necessity of having divers media in stock, many of which are expensive and time consuming in their preparation.

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Development of Leprosy Clinics in the Control of Leprosy

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SPECIAL clinics for the modern treatment of those suffering from leprosy are comparatively new in our present-day public health programs. The slow development of these clinics is undoubtedly due to our antiquated attitude toward those suffering from leprosy. Such clinics can at present be developed only in the heart of some leprosy area, as no other place would bring sufficient patients, nor would any public health board allow such clinics to be opened except in such centers. Since leprosy patients are restricted in their movements in practically every country because of society's fear of the disease, it would become difficult even for a leprologist of international repute to start a special clinic in any land except where leprosy is prevalent. Suspected cases not yet definitely diagnosed, who have means wherewith to travel, may be able to visit such leprosy specialists as are found in Hamburg, Bergen, London, New Orleans, Calcutta, Honolulu, Manila, and elsewhere: but leprosy clinics of any size operated as public health control centers could hardly be expected to develop anywhere except where leprosy is prevalent.

TUBERCULOSIS AND LEPROSY COMPARED

The tuberculous patient in any stage of the disease is allowed to travel anywhere. Clinics and sanatoria are not limited to areas where tuberculosis is common. On the contrary, they are usually built where tuberculosis is not common, where the air is rare, where sunshine is plentiful. With the present attitude of society toward leprosy leprosy clinics and sanatoria are only found in leprosy infected areas. In this respect health boards and leprologists probably have still much to learn from those who specialize in tuberculosis. In the United States the states of Colorado, New Mexico, Arizona, and California, with their sparse population, are known for their tuberculosis clinics and sanatoria. Sufferers from all over the United States go to these sunshine states. The same is true of some mountain resorts in the east of the United States. This is not a public health measure to get infective cases out of populated communities, but rather a curative measure to get the best surroundings for the patients.

Such an arrangement might seem to be indicated for leprosy even more than for tuberculosis. Leprologists all over the world have observed that leprosy seems to limit itself to more or less definite sections. There are also areas where leprosy is not found. Just why it does not thrive in some areas is not known, yet this fact seems to be a sufficient reason to think of such areas as fit for the sanatorium care of leprosy. As far as the author knows, no leprosarium is built anywhere in an area known to be free from leprosy. Even

the United States Government has built its leprosarium in the only state where leprosy has been endemic for some generations. Would not some Rocky Mountain state suggest itself as a better location for its national leprosarium?

LEPROSY CLINICS IN HISTORY

In the past leprosy clinics developed at various places owing to varying local advantages. In Japan, for instance, a large leper clinic automatically developed near the hot sulphur springs about Kasatsu, as these springs not only are said to have curative qualities, but are found near the shrine of the lepers' god where hundreds of lepers go each year to pray for the return of their health.

Another group of sufferers gathered about persons reputed to have the ability to cure leprosy. The Old Testament priest had at least the authority to pronounce one clean, and the belief in the "royal touch," or the ability of kings and emperors to cure leprosy seems to date far back in history. Chinese history bears record of men who treated many lepers. Sun-Szu-Miao (A.D. 652) is reputed to have treated 600 cases. It is easy to understand how such a man might have had special clinics to see these people, who already in his day were considered outcasts, and who, therefore, most likely were not treated with other patients. In the province of Kiangsu, China, are found several specialists who treat only leprosy, and who have had their secret prescriptions transferred to them from father to son for several generations. These leprosy specialists, of whom the author knows several, give an extensive treatment of more than 3 months, making it necessary for the patient to come to the doctor over and over, thus developing leprosy clinics at their homes. All through the infested section of Kiangsu, the names and towns of these native leprosy specialists are known, and clinics automatically develop.

The spread of leprosy in Europe during the Middle Ages was undoubtedly due in part to the great movement known as the Crusades, and reacted a bit unfavorably toward the development of leprosy clinics as curative centers. Two extreme attitudes toward leprosy developed during the Middle Ages. On the one hand, fanatics in this already highly fanatic age, craved leprosy as a sign of holiness; while others, equally under the guise of religion, pronounced those suffering from leprosy as dead to society, and after preaching their funeral sermon sent them off to asylums for life. These asylums both in Europe and South America became centers for the treatment of lepers and all through history some medical men have given much thought to the treatment of this disease, developing certain clinics about them.

As a result of the Reformation when thinkers sought to give a reasonable account of their religious beliefs, and with the establishment of modern Christian missions, when men transformed their belief into acts, better days appeared for leprosy treatment. Attempts at the scientific mastery of this baffling disease went hand in hand with sympathetic care of those suffering from the disease. In this combined religious and scientific approach to the disease, hope for the patient suffering from leprosy arose, and large leprosy centers with clinics attached, came into existence in various lands.

A chain of such leprosaria and leprosy clinics now girdles the world and reaches out to every land where leprosy is found. In harmony with the present advanced public health consciousness, forced segregation is giving way to home and clinic treatment. The Orient has many leprosy clinics that make treatments possible

for thousands of patients who would not otherwise be able to receive care in leprosaria. The European countries in which leprosy is still found have likewise leprosy treatment centers. India and the Philippine Islands lead in clinic care.

Japan has not strongly developed the clinic idea for leprosy patients, and even in Taikoo, Korea, where there is one of the earliest and best developed leprosy clinics in the Far East, the Japanese Government now has suggested a retreat in this type of public health control.

LEPROSY CLINICS AND THEIR PURPOSE

Leprosy clinics in the ideal sense are public health centers used to control leprosy. This is done as well in treating the already affected individuals as in preventing the spread of the disease in the non-affected population.

The more we learn about leprosy the more difficult it becomes to draw a clear-cut line between the infected and the non-infective groups. It is now generally agreed that the earliest detected infectious cases have already harbored the infecting bacillus for several months before detected. To set a standard whereby to determine if cases are infected or not seems to be of prime importance. Some workers use the laboratory standard. If a case under repeated examination proves negative, the case is pronounced non-infective and hence not dangerous to society. Another group of workers determines its standard upon clinical observations; and a third group upon a combination of the two. The laboratory method is a purely objective one, and should be a safe guide in every positive case. Negative and doubtful cases, however, should be verified by clinical findings. The laboratory method, therefore, has its shortcomings in both early and late cases. When the disease is well marked clinically, the bacteriological findings are usually positive. The clinical method of determining the infective cases is subjective and hence has its limitations. All clinicians are not equally keen on detecting early leprosy. For the present we shall have to content ourselves with a standard that is based upon both clinical and laboratory findings. Even in the absence, however, of positive laboratory findings, a progressive numbness with anhidrosis, and beginning alopecia and discoloration of commonly affected parts in patients in a leper area should put a physician on his guard.

Once a standard is set for the determination of a case of leprosy, the government has a right, if it decrees that leprosy is a disease dangerous to the public health of the community, to compel positive cases of leprosy to submit themselves to treatment. This treatment must necessarily be free of charge to the patient and most human in all its methods. Segregation in institutions may be necessary in some cases, but must always be looked upon as the most extreme method any government can take in its public health control program.

The first method that suggests itself in modern public health control for leprosy infected areas is the organization of leprosy clinics where patients can go for diagnosis, get treatment, and be instructed in proper preventive measures to protect the non-affected population, and still remain at home. The number of such clinics will depend upon the extent of the leper area and the distances patients will have to go to the clinic. Large central clinics with laboratory facilities and small outlying clinics to bring the clinic to the patients, forming one complete unit, are usually found in large infected areas. The best examples of such clinics are found in India, in the Philippines and in the Dutch West and East Indies un-

der the new government program just recently put into effect.

Although this type of public health control of leprosy is still in its infancy, it promises to become the generally accepted method, as it aims primarily at general public health control along the most up-to-date theories of the prevention of other infectious diseases, is the cheapest method for the wholesale treatment of leprosy patients, and brings the greatest number of patients to the small number of fully qualified specialists that is available in the fight against this baffling disease.

LEPROSY CONTROL CLINICS

In practically every modern country of the world leprosy control is in hands of the national health department. Most countries have definite legislation for the control of leprosy. The various colonial possessions of the European nations have similar legislation. During periods of legislative control, leprosy has been greatly reduced in Europe, and consequently occurs rarely now in these countries. In no part of North America has leprosy ever developed to any alarming proportions.

In Africa and the Orient practically every country with the exception of China is now exercising a definite public health campaign against leprosy. Religious institutions have done their part in first calling attention to the need and giving the first help to the sufferers, but without government health legislation all this work had little value from a public health viewpoint.

The exceedingly progressive public health campaigns carried on by the British Government in India and Africa, the American Government in the Philippines, the Dutch and French Governments in their colonial possessions, have made leprosy control one of the major public health questions now discussed at the International Medical Conferences of the East.

A study of the leprosy control situation in China reveals that with the exception of South China, the government up to the present has not been able to take a firm hand. There is every reason to believe, however, that the National Health Administration of China, under the exceedingly able leadership of Dr. J. Heng Liu will before long set machinery into operation aiming at the control of leprosy in China, the most highly infected country of the world.

For the present most of the leprosy control work in China is in the hands of medical missionaries, largely financed by their home churches, and the British, American, and Chinese Mission to Lepers. Without government coöperation, it is evident, that the work done by these mission institutions is of very limited value from an active public health viewpoint. Religiously, philanthropically, and for propaganda purposes, the value of this pioneer work of medical missionaries cannot be overestimated. Much of this is an attempt to do real scientific work as well as religious and philanthropic, and is gratefully accepted by the government.

Leprosy clinics in China are of two kinds—one group is attached to the out-patient department of the general hospitals, the other is independent of the general hospital. Among the first, very few clinics develop to anything really worth while from a public health leprosy control viewpoint. These clinics are held largely with the purpose of keeping the unwanted leprosy patients away from the other out-patients. Sometimes certain days are set aside, in other cases after-clinic-hours are used for these special clinics. In our survey not less than 80 per cent of the leprosy clinics in China are of the latter type.

The second group of clinics, or those independent of the general hospital out-patient department, are either as-

sociated with leprosaria or are run entirely independently. The latter is more desirable as the clinics set themselves to a task quite different from that of most leprosaria. In our survey we find that clinics associated with leprosaria amount to 20 per cent of the whole, and the independent leper clinics make up less than 1 per cent of all leprosy combating agencies in China.

Of all the leper clinics in China we know of not one whose professional personnel devotes its time exclusively to leprosy.

As to the geographical distribution of the leprosy treatment centers, it is encouraging to note that in each of the 6 large leprosy areas of China some such clinics are found. The distribution is as follows:

LEPROSY TREATMENT CENTERS IN CHINA

Shantung Area	6%
Kiangsu Area (including Chekiang)	22%
Kansu Area	3%
Hunan-Kiangsi Area	15%
Kwantung-Fukien Area (largest area)	45%
Yunnan-Kweichow	9%
	100%

It would seem essential in case the National Health Department of China eventually passes legislation to include leprosy control within its scope, to incorporate all these clinics and institutions in its program.

Although the leprosy clinic in Shanghai, operated by the Chinese Mission to Lepers, can at its very best reach only a comparatively small number of patients, since the Shanghai area itself is not a leper area, but harbors several cases that come in from other parts of China, it may be said that this clinic can do very effective work in rounding up all the cases and treating them. The authorities of the various municipalities coöperate with the Mission to Lepers in leprosy control, and the various medical centers are being brought in line to coöperate with the Shanghai Leprosy Clinic in making this clinic accessible for teaching purposes. From various angles, therefore, this clinic becomes one of the most important clinics in China.

The leprosy clinic of Cheloo University Medical School is also largely used for teaching purposes and rates high as an active leprosy control agency in the oldest known leprosy area of China, the Shantung province.

The two largest leprosy clinics, both under mission auspices are one at Swatow under Dr. V. D. Fraser, and another at Jukao, Kiangsu, operated by the Christian Reformed Church of America. At each of these the number of patients attending the weekly clinic has reached 100 or more. Both clinics have laboratory facilities and give the latest in treatment. Both clinics are seeking to develop extension programs into the surrounding countryside.

China is one of the most heavily infected leprosy countries in the world and taking all these clinics together even when they are doing their very best work, it remains to be said of their attempt as of the five loaves and a few fishes to feed a multitude of five thousand, "What are these among so many?"

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Administration of Health Education and Health Supervision in Negro Colleges

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ACCORDING to the Committee on Approval of Negro schools,[1] the enrollment in Negro colleges has increased from 2,637 in 1916, to 26,339 in 1934–1935. Thus, approximately 27,000 persons aged 17 to 21 are in attendance at institutions of higher education for 2 to 4 or 5 years. It is said that less than 1 per cent of the population of the United States is composed of college graduates, and yet more than 50 per cent of the positions of influence and leadership in the life of the people are occupied by college men and women.[2] It may be assumed that if this group of future leaders is made health conscious through good health education and health supervision, they will in turn influence their families and communities and thus help in improving the health of the Negro. It is, therefore, of some importance to know the extent and status of health education in Negro colleges.

A questionnaire dealing with (1) the hygiene teaching, (2) the sanitary supervision, and (3) the health services offered to students during the school year 1933–1934 was sent to 99 Negro colleges. After repeated requests, 40 per cent of the schools responded. As shown in Table I, of the 40 schools, 38 reported an attendance of 11,909 students or about half of the total enrollment in Negro colleges.

TABLE I

ENROLLMENT IN NEGRO COLLEGES

Attendance	*No.*	*No. of 4 Yr. Colleges*	*No. of 2 Yr. Colleges*	*Total Attendance*
50– 99	4	1	3	271
100–299	20	16	4	4,157
300–499	6	6	..	2,283
500 and over	8	8	..	5,198
Attendance not given	2	0	2	....
Total	40	31	9	11,909

Of these 40 schools, 9 were 2 year colleges with an enrollment of approximately 800, since only 7 of these reported their attendance; and 31 were 4 year colleges with an enrollment of 11,131. For the purpose of discussion, the schools have been divided according to attendance. There are 4 with an attendance of less than 100 students; 20 of 100 to 299; 6 of 300 to 499, and 8 with 500 or more students. Thus, the majority of schools are to be found in the second group of 100 to 299 students.

Forsythe,[3] Hughes,[4] and Storey[5] have stated that health education should include 4 phases: (1) Informational Hygiene, (2) Administrative Hygiene, (3) Student Health Service, and (4) Applied Hygiene or Physical Education. In this study we have confined our interest to the status of the first 3 phases.

INFORMATIONAL HYGIENE

Hygiene teaching has become an integral part in the curricula of most colleges. Through lectures, library assignments, laboratory exercises and personal conferences, the student is able to understand the fundamental principles of human physiology, and is better able to comprehend the reasons for the health practices advocated. How is informational hygiene administered in this group of schools? Table II shows that of the 40 schools, 9 have a separate division of hygiene and health education; while in 31, the administration is placed in the hands of one or more departments.

TABLE II

INFORMATIONAL HYGIENE ADMINISTRATION

Attendance	*No.*	*Schools Having Separate Dept.*	*Schools Having Combined Dept.*
50– 99	4	..	4
100–299	20	3	17
300–499	6	3	3
500 and over	8	3	5
Attendance not given	2	..	2
Total	40	9	31

The departments in charge of hygiene teaching are shown in Table III.

TABLE III

Department Having Charge of Hygiene Teaching	*No. of Schools*
Physical Education	10
Natural Science	10
Home Economics	2
Social Science	1
Education	1
Academic	1
Two or more Departments	2
No data	4
Total	31

Thus, it is seen that approximately two-thirds of the schools have placed their educational activities in the department of physical education and natural science. The 9 schools which reported separate departments of health education stated that they had a total of 29 instructors engaged in hygiene teaching; while 28 of 31 schools with combined departments reported a total of 47 instructors. Of the 76 instructors, 47 had only college degrees; while 25 had done graduate work in some special field. These figures show an inadequacy in personnel both from the standpoint of quantity and quality.

Since the emphasis during the past 2 or 3 decades has been on health education, it would seem that one or more courses would be offered by every college. Table IV shows this not to be the case. Of the 40 schools, 34 stated that they offered courses in hygiene, but only 27, or 68 per cent, offered required hygiene courses. Thus, approximately 32 per cent of the schools leave their health education to the whims of the student. The 34 schools

TABLE IV

HYGIENE COURSES

		Courses in Hyg.		*No. Courses Offered*			
Attendance	*No.*	*Yes*	*No*	*1*	*2*	*3 or More*	*Schools Offering Required Courses*
50– 99	4	3	1	3	..	..	2
100–299	20	16	4	9	4	3	13
300–499	6	6	..	2	2	2	4
500 and over	8	7	1	..	4	3	7
Attendance not given	2	2	..	2	..	..	1
Total	40	34	6	16	10	8	27

TABLE V

SEX AND MENTAL HYGIENE

Courses	*Schools Responding*	*No. of Lectures Given*				*At Discretion of Teacher*
		None	*2*	*3*	*4–10*	
Sex Hygiene	28	8	7	2	8	3
Mental Hygiene	28	9	3	5	9	2

offered a total of 65 courses or an average of 1.9 courses per school; but approximately 50 per cent of this group offered only 1 course. The 27 schools which reported required courses gave a total of 44 courses, 19 of which were offered to freshmen; 2 to sophomores; 2 to seniors, 7 to physical education students; 12 to education and normal students; and 2 to home economics students.

In view of the importance of sex and mental hygiene in the curriculum, it is interesting to note from Table V that practically one-third of the schools do not include lectures on these subjects in their required courses.

The total attendance in these hygiene courses during the school year 1933–1934 is of interest. Of the 34 schools, 30 reported that 2,983 students attended the required and elective courses, 2,518, or 84.4 per cent, attended the required courses, and only 465 students the elective courses. These 30 schools had an approximate total attendance of 8,660 students. The small number in the elective course would seem to be due to lack of sufficient courses, or the inability of the initial hygiene course to stimulate desire for more knowledge of matters pertaining to individual and community health.

SANITATION

The tendency in public health work is primarily to stress individual health promotion, and sanitation has been somewhat pushed in the background. However, sanitation is an important item in college health activities and should always be considered. Of 40 schools, 35 stated that they carried out sanitary inspection. The administration of sanitation in Negro colleges is in the hands of various groups, as seen in Table VI. The work generally falls either on the matrons and deans or on the superintendents of buildings.

Twenty-seven of 35 schools show this to be true. The reports of 17 schools reveal that much of the function of these supervisors is concerned primarily with lighting, ventilation and water supplies in campus buildings. The dormitories in practically all instances

TABLE VI

SANITARY SUPERVISION

Attendance	*No.*	*Schools Reporting*	*In Charge of Sanitary Supervision*				
			Business Office	*Matron or Dean*	*M.D.*	*Supt. Bldg.*	*Faculty Comm.*
50– 99	4	4	1	3	..	..	..
100–299	20	17	2	6	..	7	2
300–499	6	5	..	1	1	2	1
500 and over	8	7	..	4	1	2	..
Attendance not given	2	2	..	2	..	..	..
Total	40	35	3	16	2	11	3

TABLE VII

HEALTH SERVICE ADMINISTRATION

			Health Service Administrators				
Attendance	*No. of Schools*	*Schools Reporting*	*M.D.*	*Div. Student Health*	*R.N.*	*Health Dept. City*	*Other Groups*
50– 99	4	4	4	..	..	..	..
100–299	20	20	10	2	2	2	4
300–499	6	6	3	2	1	..	..
500 and over	8	8	3	3	1	1	..
Attendance not given	2	2	1	..	..	..	1
Total	40	40	21	7	4	3	5

were inspected daily by the matrons or deans; but only 1 school out of 30 periodically inspected houses not on the campus. From the answers to the questions on sanitation, which were rather incomplete, one received the impression that houses not on the campus are considered approved as long as the proprietor is known to be respectable. Respectability seems to be more important than the knowledge of good sanitary practices. In no answer was the examination of food handlers, sanitation of kitchen, etc., mentioned.

As to the sanitary records, there is no unanimity as to where these should be kept. Only 13 of 35 schools kept sanitary records—6 in the business office or that of the superintendent of buildings and grounds; 2 in the president's office; 1 in the state department of health; 1 in the dean's office; 1 with head of the department of physical education; 1 in the division of hygiene and health, and 1 in the city health department.

STUDENT HEALTH SERVICES

The well conducted student health service is a very important factor in the college hygiene program because it serves as the avenue through which the individual is taught certain procedures which will be of importance to him in later life. The periodic health examination, dental examination, defense against quackery, good personal habits are factors which are generally instilled by association with a well organized health service. What is the status of health services in Negro colleges?

The administration of health services is in the hands of a variety of organizations as shown in Table VII. Only 70 per cent of the schools have this activity under the direction of a physician. The others are in the hands of a nurse, a dean, a matron, or in the physical education department. Of the 40 schools, 37 with a registration of approximately 11,000 students employed 117 physicians and nurses, not all on full-time basis. Table VIII shows that 11 schools employed 16 full-time physicians; 29 employed 46 part-time physicians, but most of these were in the capacity of consultants since only 5 schools had both part-time and full-time doctors; 18 had 32 full-time nurses; 12 had 13 part-time nurses, and 4 had 10 consulting specialists. What is more astounding is that 3 of the 40 schools employed neither physician nor nurse during the school year 1933–1934.

It would seem that an entrance physical examination would be a part of every health service, yet only 24 of the 40 schools require this, and in only 18 of these 24 was the examination exclusively performed by the school

TABLE VIII

HEALTH SERVICE PERSONNEL

		Physicians				*Nurses*				*Schools with*
Attendance	*No.*	*Schools Reporting*	**F.T. M.D.*	*Schools Report.*	**P.T. M.D.*	*Schools Report.*	**F.T. R.N.*	*Schools Report.*	**P.T. R.N.*	*No M.D. or R.N.*
50– 99	4	1	1	3	3	..	..	1	1	..
100–299	20	5	5	16	24	5	7	8	8	2
300–499	6	1	2	4	5	5	8	..	..	..
500 & over	8	4	8	5	13	8	17	2	3	..
Attendance not given	2	..	..	1	1	..	..	1	1	1
Total	40	11	16	29	46	18	32	12	13	3

* F.T. = Full-time; P.T. = Part-time.

physician. The figures for the different groups are shown in Table IX. Of the 16 schools which did not require entrance examination, 9 examined all their students during the first year; 2 examined them occasionally, and 5, or 13 per cent, offered no type of examination. Each of these 5 schools had an attendance of less than 300 students.

The results of the entrance physical examination are very short lived unless attempts are made to discover the effectiveness and the extent of corrections due to the entrance examination. Of the 24 schools which gave an entrance examination, 18 stated that they carried out certain follow-up procedures, 7 sent recommendations to parents, 7 performed reëxamination and again recommended corrections, while 4 sent their students to nearby clinics for corrections or offered treatment to them in their own clinic or dispensary. Thus, only 17 per cent of the schools made any effective effort to improve the status of the apparently healthy student. Figures on the percentage of corrections achieved during the first and second years in 3 of the 4 schools just mentioned are of some significance. Cheyney Teachers' College in Pennsylvania, which sends students to clinic in Philadelphia, stated that 25 per cent of the defects were corrected during the first year and 15 per cent during the second year of attendance. Tuskegee, which rechecks and offers treatment for defects during the semester, shows 25 per cent and 50 per cent corrections respectively; and Hampton Institute, where reëxamination followed by treatment is practised, stated that 75 per cent of the defects were corrected dur-

TABLE IX

HEALTH EXAMINATION

		H.E. Required		*H.E. Performed by*		
Attendance	*No.*	*Yes*	*No*	*School M.D.*	*Home M.D.*	*Either*
50- 99	4	2	2	1	1	..
100-299	20	12	8	9	2	1
300-499	6	4	2	3	..	1
500 and over	8	6	2	5	..	1
Attendance not given	2	..	2	..	..	..
Total	40	24	16	18	3	3

TABLE X

HEALTH EXAMINATION OF ATHLETES

Attendance	*No.*	*Number Reporting*	*Health Exam. of Athletes*		*Performed by*		
			Yes	*No*	*M.D.*	*Coach*	*R.N.*
50– 99	4	4	2	2	1	1	..
100–299	20	19	17	2	9	8	..
300–499	6	6	6	..	5	1	..
500 and over	8	8	8	..	5	2	1
Attendance not given	2	2	1	1	..	1	..
Total	40	39	34	5	20	13	1

ing the first year. Incidentally, Cheyney has less than 300 students, while the other two have more than 700 students each.

As to the health examinations of athletes, which is a definite responsibility of every college, it is seen in Table X that 34 of 39 schools answered this query in the affirmative. However, it is noticed that of these, 13 gave the responsibility to the coach rather than to a physician. Thus, it may be said that only about 50 per cent of the schools actually offer this service.

DISPENSARY SERVICE

The dispensary service plays a very important part in the prevention of disease in the college, since a centrally located and well organized dispensary beckons to the student when he first feels the symptoms of disease. Through friendly, sympathetic and scientific advice, diseases in the early stages are aborted, protracted treatments are avoided, and much loss of time from school and waste of money are prevented. Dispensary service is not found in all Negro colleges—33 per cent stated that they did not offer this service. This varied from 40 per cent in the group with an attendance of 100 to 299 students, to 17 per cent in the 300 or more group as shown in Table XI. Of the 27 schools which had dispensary service, 12, or a little less than half, were in charge of physicians; 10 in charge of nurses, and 4 were administered by matrons or deans.

The value of the dispensary is partly gauged by the number of calls made to it. In Table XII an attempt is made to analyze the problem in 10 colleges

TABLE XI

DISPENSARY ADMINISTRATION

Attendance	*No.*	*Dispensary*		*Charge of Administration*			
		Yes	*No*	*M.D.*	*R.N.*	*Dean or Matron*	*No Report*
50– 99	4	1	3	..	..	1	..
100–299	20	12	8	5	4	2	1
300–499	6	5	1	3	2	..	..
500 and over	8	7	1	4	3	..	..
Attendance not given	2	2	..	..	1	1	..
Total	40	27	13	12	10	4	1

TABLE XII

NUMBER OF CALLS TO DISPENSARY

School	Attendance	Separate Dept. of H. E.	P. E. Required at Entrance	Administrator of Dispensary	Equipment	Calls per Day per 1,000 Students
Bishop	574	No	No	R.N.	First Aid	8.7
Wilberforce	689	Yes	Yes	M.D.	Fully Equip.	10.2
Fisk	389	Yes	Yes	M.D.	Fully Equip.	12.9
West Virginia	486	Yes	No	M.D.	Fully Equip.	14.4
Tuskegee	729	Yes	Yes	Health Div.	Fully Equip.	34.3
Prairie View	583	No	Yes	R.N.	Fully Equip.	34.3
A. M. Florida	469	Yes	Yes	Hosp. Med. Direct.	Fully Equip.	42.6
Langston Oklahoma	571	No	Yes	M.D.	Not Given	43.8
State A. M. College	325	No	Yes	R.N.	First Aid	46.2
Virginia State	639	No	No	R.N.	Fully Equip.	54.8

with an attendance of more than 300. It has been shown that the number of calls to college dispensaries varies with such factors as equipment, the requirement of a physical examination at entrance, the type of persons in charge, etc. This unfortunately cannot be shown in this table. It is noted, however, that the number of calls per 1,000 students per day, varies from 8.7 to 54.8, and that close to 40 per cent of the dispensaries fall below the standard of 30 calls.

The most common diseases treated in these dispensaries were reported by 18 of the 27 schools. Table XIII gives the diseases and the number of schools reporting them. The results are in agreement with more extensive morbidity studies in schools and in the general population carried out by the U. S. Public Health Service.[1, 2]

TABLE XIII

Diseases Reported	No. of Schools Reporting
Coryza	17
Dysmenorrhea	11
Tonsillitis	10
Constipation	10
Minor Injuries	10
Indigestion	7
Headache	4
Eye Disease	4
Influenza	4

INFIRMARY AND HOSPITAL SERVICE

The provision of bed care is a unit in the complete health service program which should be found in every college

TABLE XIV

INFIRMARY SERVICE

Attendance	No.	Schools Reporting	Infirmary: Yes	Infirmary: No	Administrator: M.D.	Administrator: R.N.	Administrator: Dean or Matron
50– 99	4	3	..	3	..	..	..
100–299	20	18	9	9	3	5	1
300–499	6	6	4	2	2	2	..
500 and over	8	8	6	2	3	3	..
Attendance not given	2	2	2	..	..	1	1
Total	40	37	21	16	8	11	2

either through the hospital or the infirmary, or both, but is sadly lacking in Negro colleges. In Table XIV it is seen that only 21, or 57 per cent, of the schools provide this service. No school in the attendance group of less than 100 students had infirmary service, while in the group of 300 to 500 and over the percentage rose to 71. Even in the larger schools approximately 30 per cent have no bed care. As in the case of the dispensaries, the infirmaries are in charge of either a physician, nurse, or matron. As far as hospital care is concerned, only a small number have official hospital connection. Of the 40 schools, only 9 offered these services.

RECORDS AND FEES

Since the college student spends from 2 to 4 years in college, it is the responsibility of the college to keep a complete health record of every individual, so that each illness may be understood in the light of previous ailments, and every bit of advice, corrections, etc., may be recorded. In Table XV it is noted that only 21 of the 36 schools keep health records. Even in the 14 institutions with 300 or more students, only 10 keep such records, and they are kept in a variety of places—7 in a hospital or infirmary, 5 in the superintendent's or dean's office, 3 in the office of the school physician, 3 in the department of physical education, 2 in the office of a nurse, and 1 in the division of hygiene.

TABLE XV

HEALTH RECORDS

Attendance	*No.*	*Schools Reporting*	*Complete H. R. Kept*	
			Yes	*No*
50– 99	4	4	1	3
100–299	20	17	10	7
300–499	6	6	4	2
500 and over	8	8	6	2
Attendance not given	2	1	..	1
Total	40	36	21	15

Although the college is responsible for the health of the student, the latter should contribute financially to the upkeep of this service. In Table XVI it is noted that of 37 schools, only 24 required a health fee. Thus, approximately one-third of the schools make no charges. However, even in the schools which make this requirement, the amount collected is very small. Half of the schools have a fee of less than $4. Both of these factors may in a measure account for the paucity of health activities in this group of 40 schools.

SUMMARY AND CONCLUSIONS

The foregoing data reveal that in the 40 schools with half the total attendance found in all Negro colleges, the

TABLE XVI

HEALTH FEE

Attendance	*No.*	*School Reporting*	*Health Fee Required*		*Amount Collected*			
			Yes	*No*	*$.50–1.99*	*$2.00–2.99*	*$3.00–3.99*	*$400 and Over*
50– 99	4	4	2	2	..	..	1	1
100–299	20	19	11	8	2	5	2	..
300–499	6	6	4	2	1	1	1	1
500 and over	8	7	6	1	..	2	4	..
Attendance not given	2	1	1	..	..	1	..	..
Total	40	37	24	13	3	9	8	2

health programs are very inadequate, and the impression is derived that most of these have been developed in a pell-mell fashion with no thought of coördination or completeness. Confusion in the administration and inadequacy of personnel, equipment and procedures are noticed in the hygiene teaching, sanitary supervision and health service. On the basis of this survey, these deficiencies would seem to be due to one or all of the following factors:

1. Very inadequate health fee
2. Lack of coördination of the reported practices and procedures
3. Lack of adequately trained personnel

Each of these factors can and should be ameliorated so that the bulk of Negro college students will receive a thorough training in the principles and practices of hygiene.

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What Is the Air Hygiene Foundation?

THE Air Hygiene Foundation of America is an alliance of industry and science which seeks to eliminate or control industrial diseases caused by air pollution. Of special interest is silicosis, which endangers the health of workmen and investments of industry.

Leaders in steel, mining, glass, foundry, refractories, ceramics, the quarry, and kindred industries, realizing the need for coöperative action in facing the industrial dust problem, organized the Air Hygiene Foundation of America in 1935.

The Foundation is now engaged in a far-reaching undertaking, gathering together all pertinent facts relating to pneumoconiosis in the fields of medicine, engineering, and law.

This work is under the supervision of Managing Director H. B. Meller, and three major committees, the medical, engineering, and legal.

The Foundation is coöperating with the U. S. Department of Labor in its National Silicosis Conferences. The department in turn has promised coöperation to the Foundation in its activities. Coöperation has also been pledged by the U. S. Bureau of Mines, the U. S. Public Health Service, the American Standards Association, state medical societies, companies, corporations, and trade associations.

Effectiveness of the Methods of Dish and Utensil Washing in Public Eating and Drinking Establishments

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AWARE of the fact that many communicable infections are contracted orally and that public eating and drinking establishments are gaining in popularity, we decided to determine if utensils in these establishments might possibly be considered as vectors in the dissemination of infections which are spread from mouth to mouth. It seemed reasonable to believe that, if upon examination many organisms were found, the dishwashing process was unsatisfactory from a bactericidal standpoint because pathogenic as well as non-pathogenic bacteria would survive.

With this thought in mind we have endeavored to ascertain the bactericidal value of the methods of washing dishes, glasses, silverware, and other utensils in various public eating and drinking establishments. The survey as carried out by this department included restaurants, soda fountains, luncheonettes, and beer and liquor dispensing establishments. In the greater majority of these places, with the exception of those that dispense beer and liquors, the dishes and utensils are washed after each use in soapy water, the temperature of which is in most instances luke warm, followed by a hot or cold water rinse. Glasses used for dispensing beer and other alcoholic beverages are, in a few instances, washed in hot soapy water once daily and rinsed in cold water after each individual use. In the majority of alcoholic beverage dispensing shops, information was obtained which tends to show that the glasses are washed with soap and hot water at intervals varying from two to three times weekly. After each individual use they are rinsed only with cold water followed by polishing with a presumably clean towel.

SAMPLE COLLECTION KIT

The field equipment developed by this department to obtain bacteria counts from spoons, forks, tumblers, and dishes is as follows: Absorbent cotton swabs about ¾" x ¼" were made with 6" applicator sticks, and the upper end forced through a cork large enough barely to fit test tubes ⅞" in diameter by 5" in length. The stopper containing the swab was then placed lightly in the test tube and sterilized by autoclave, 15 lb. for 20 minutes. After sterilization the tubes are removed from the autoclave, and the stoppers are seated. These swab sets, several sterile 20 c.c. screw-cap vials, 10 c.c. sterile pipettes, a 212° F. thermometer, and several small bottles of sterile water constitute the kit used by the inspectors for obtaining the various samples for bacteriological examination.

SAMPLE COLLECTION TECHNIC

Samples were obtained by the following technic: During or just after the noon hour rush, from utensils which were washed and ready for the customers' use, a fork and a spoon were selected from the racks or drawers in which they were contained, and the entire area that comes in contact with the user's mouth was rubbed over at least three times with the sterile swab which had been just previously dampened in sterile distilled water. (It was found that if the swab was highly saturated with water, as it was passed over the surface of the utensil it would leave a film which might have a tendency to withdraw some of the organisms from the swab.) The swab was then immediately placed in the test tube. In the case of tumblers, two were selected and the same procedure was followed, but specimens were taken only from the area which ordinarily comes in contact with the lips, that is, approximately ½" down from the upper edge, and completely encircling the inner and outer surfaces. Samples (10 c.c.) of the wash and rinse waters were also taken by sterile pipette and placed in sterile screw-capped vials.

LABORATORY TECHNIC

The time lapse between the collection of the samples and their arrival at the laboratory for plating was from 1 to 3 hours. The procedure used in the laboratory for evaluating the number of bacteria was carried out as follows:

1. 5 c.c. of sterile water were added to each tube.
2. The swab handle was so adjusted in the stopper that the lower half of the swab was submerged.
3. The tube was then shaken violently against the palm of the hand 50 times for the purpose of liberating the bacteria from the swab.
4. Holding the swab handle between the thumb and index finger, the swab was then drawn up from the water and rolled against

TABLE I

SUMMARY OF BACTERIOLOGICAL EXAMINATIONS OF SPECIMENS COLLECTED FROM BEER GLASSES AND RINSE WATERS IN PUBLIC BARS AND TAVERNS

Establishment No.	Bacteria per Utensil		Bacteria per c.c. Rinse Water	
	Tumbler	*Tumbler*	*Total Count*	*Colon Group*
51	20,000	Accidentally Contaminated	8,000	384
52	49,000	46,000	640,000	19,000
53	3,830	12,000	4,000	1,042
54	2,260	14,000	87.000	576
55	49,000	61,000	134,000	3,456
56	31,000	80,000	650,000	12,000
57	85,000	46,000	770,000	2,300
58	42,000	86,000	384,000	15,000
59	49,000	95,000	6,500,000	14,000
60	52,000	49,000	390,000	2,600
61	67,000	84,000	4,400,000	166,000
62	31,000	13,000	5,000,000	1,700,000
63	26,000	98,000	2,000,000	51,000
64	95,000	115,000	11,000,000	56,000
65	78,000	46,000	3,500,000	3,200
66	61,000	15,000	43,000	1,100
67	104,000	46,000	400,000	83,000
68	78,000	104,000	450,000	200
69	61,000	52,000	120,000	900

TABLE II

SUMMARY OF BACTERIOLOGICAL EXAMINATIONS OF SPECIMENS COLLECTED FROM UTENSILS AND WASH WATERS IN PUBLIC EATING AND DRINKING PLACES

		Bacteria per Utensil			*Bacteria per c.c.*		
Establishment No.	*Type of Place*	*Fork*	*Spoon*	*Tumbler*	*Tumbler*	*Wash Water*	*Rinse Water*
1	Drug, Soda, Lunch	445	35	1,920	2,240	....	97,000
2	Soda, Lunch	1,090	640	2,880	3,420	....	14,000
3	Drug, Soda, Lunch	615	170	65,000	69,000	2,300	....
4	Restaurant	1,125	43,000	1,845	55	250,000	....
5	Tea Room	920	960	605	1,280	26,000	....
6	Cafeteria	320	230	1,050	....	44,000	....
7	Lunch	20	60	71,000	34,000	20,000	....
8	Diner	45	2,400	57,000	65,000	928,000	....
9	Lunch	55	65	12,000	45,000	430,000	....
14	Lunch	45	25	27,000	16,000	....	....
15	Dairy Lunch, Soda	100	1,600	115,000	150,000	....	38,000
16	5 and 10 Soda, Lunch	24,000	26,000	10,000	23,000	384,000	....
17	5 and 10 Soda, Lunch	1,920	2,880	40	45	6,000	....
18	Restaurant	40	10	15	60	2,800	....
19	Drug, Soda, Lunch	45	135	55,000	26,000	1,650	....
20	Hotel	35	200	690	70	6,000	....

NOTE: Where no count appears samples were not obtainable.

the upper portion of the tube in order to expel therefrom as much of the remaining water as possible.

5. The swab was then removed and 1 c.c. of the water in the tube plated undiluted, and when desirable 1 c.c. of a 1 to 10 dilution was also planted.

The media used was Difco Nutrient Agar. Dilutions of 1 to 100 and 1 to 1,000 or higher when desirable, of rinse and wash water samples were also plated on similar media. In order to attempt to ascertain whether or not organisms of the coli-aerogenes group were present in a few instances, pour plates were made on Endo's media from a 1 to 100 dilution of the rinse and wash waters. An index of the laboratory results will be found in Tables I and II.

At the time of taking samples the inspectors recorded on previously prepared forms the general sanitary condition of the establishment, the method of washing and sterilizing the utensils, the physical appearance and temperatures of the wash and rinse water, the amount of visible debris on the utensils, the kind of soap, detergent, or sterilizing agent used, the method of drying, and whether or not automatic

TABLE III

TEMPERATURES OF WASH AND RINSE WATERS IN PUBLIC EATING AND DRINKING PLACES

Establishment No.	*Temperature of Wash Water*	*Temperature of Rinse Water*
1	98° F.	90° F.
2	103°	Tap— 60°
3	90°	" — 60°
4	105°	105°
5	100°	140°
6	120°	Dishes not rinsed
7	120°	"
8	120°	"
9	100°	Scalds
10	100°	Dishes not rinsed
11	95°	"
12	90°	"
13	84°	"
15	116°	118°
16	94°	108°
17	100°	104°
18	164°	130°
19	110°	124°
20	100°	166°

TABLE IV

TEMPERATURES OF RINSE WATERS IN ALCOHOLIC BEVERAGE DISPENSING ESTABLISHMENTS

Establishment No.	*Temperature of Rinse Water*
51	70° F.
52	80°
53	77°
54	70°
55	74°
56	70°
57	70°
58	70°
59	72°
60	70°
61	70°
62	72°
63	70°
64	74°
65	72°
66	70°
67	76°
68	70°
69	76°

washing machines were used. Temperatures of some of the wash and rinse waters will be found in Tables III and IV.

In none of the bars were glasses or mugs washed in either hot or cold soapy water after each use.

In view of the fact that the bacterial count was excessive in all wash and rinse waters and of many utensils, it seems conclusive that the methods used act only as a detergent by the partial removal of food particles from the various utensils, but do not have any appreciable bactericidal value. It seems only logical to conclude that the washing of silverware, glasses and dishes in water of a high bacteria content would cause their gross contamination which might possibly lead to the infection of many individuals when these waters are contaminated by utensils used by a person harboring disease producing organisms.

The proprietors of several restaurants and taverns have agreed to coöperate with this department in order that we may carry out control studies relative to various methods of chemical sterilization or disinfection of eating utensils. This work is now being carried out, and a report will be submitted at a later date.

National Medical Council on Birth Control

THE National Medical Council on Birth Control has recently been formed to control and supervise medical policies of the American Birth Control League and to initiate, encourage, and execute appropriate scientific research in the medical aspects of birth control.

Frederick C. Holden, M.D., of New York, is Chairman, and Eric M. Matsner, M.D., member A.P.H.A., of New York, is Executive Secretary of the Executive Committee.

Lead Content of Chewing Tobaccos and Snuffs

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IN 1921 Cadenhead and Jacques,[1] impressed by the fact that lead may find its way into smoking tobacco from the foil in which it may be wrapped, performed an experiment to show that, at least when lead was added to the tobacco to the extent of 17 per cent, small quantities might be volatilized during smoking and thus pass into the smoker's system. In 1929 Reitzel[2] summarized the work that had been done on poisoning resulting from lead in snuff. One other publication[3] on this subject has since appeared. No references to the occurrence of lead in chewing tobacco have been found.

In all the publications mentioned the presence of the lead was attributed to the use of lead chromate to improve the color of snuff, or to contamination from the lead containing foils in which the products were wrapped. The lead content is stated to have been over 3 per cent in one case.

It is probable that cases of such gross contamination are rare today, but since lead arsenate is used in protecting growing tobacco from damage by insects, it is evident that many manufactured tobacco products will contain at least traces of lead.* Reitzel[2] refers to this possible source of contamination. The literature appears to contain no recent references to any extended analyses for lead of various brands of tobacco products, probably for the reason suggested by Reitzel, namely, that the Food and Drugs Act does not include tobacco products within its scope. The suspected snuffs in the cases reported by Bauer and Ropes[4] contained about 0.2 grain of lead per pound (30 p.p.m.), which may have been due to spray residue.

Because of the chance of direct entry of lead into the system from the use of chewing tobacco and snuff, an investigation of its occurrence in these two products was undertaken. Seven samples of snuff and 9 of chewing tobacco, representing in each group the products of 6 manufacturers, were obtained from stores in Washington, D. C. The samples of chewing tobacco were first dried so that they could be ground in a mortar. Both the weights as received and the dry weights were recorded so that the results could be calculated back to the original basis. After pulverization and thorough mixing, duplicate samples were taken for analysis.

The snuffs were all in such a form that no grinding was necessary. Two or more boxes of snuff were well mixed together before samples were taken.

Chewing tobacco No. 5 was taken from a package having an outside wrapping of metallic foil that was found to contain a large percentage of lead.

* The present policy of the Department of Agriculture is to discourage the use of lead arsenate for the control of leaf-feeding tobacco pests in cases where large deposits of the material will be left on the crop at harvest time.

There was, however, a sheet of waxed paper next to the tobacco, and it is unlikely that the metal wrapper contributed much to the lead content. The metallic labels on some of the plug tobaccos were found to be free of lead.

Considerable difficulty was encountered in developing a method for the determination of lead. Of several tried, the electrolytic " mush " method as used for the determination of lead in sprayed apples [5] appeared most promising, but the results obtained at first were not consistent because of the formation of a precipitate when the solution containing the lead was made alkaline preparatory to the extraction of the lead with a chloroform solution of diphenylthiocarbazone. It is believed that this precipitate, probably consisting largely of the phosphates of the calcium and iron groups, occludes some of the lead. It was discovered, however, that sodium hexametaphosphate * will prevent the formation of this precipitate, or at least retard it sufficiently to permit the extraction to be made. Even so, 10 grams of tobacco was the most that could be handled, and this forced the adoption of the small anode and the very dilute thiosulphate solution used in the later stages of the procedure. The method as finally adopted is described in some detail here, because careful observance of these details is necessary if satisfactory results are to be obtained.

ANALYTICAL PROCEDURE FOR LEAD

Place 10 gm. of tobacco (dry weight) in a 400 c.c. beaker, moisten with water (to prevent combustion when heated with nitric acid), and add 50 c.c. of concentrated nitric acid. Allow the contents to stand, with a watch glass over the beaker, until the initial action has subsided. Place the beaker over a flame and boil for about ½ hour or until the material is well mushed. Dilute the mushed solution when cool, transfer to a 300 c.c. volumetric flask, make to the mark, allow to stand for 15 minutes (shaking at short intervals), filter, and take a suitable aliquot (200 c.c.) for the analysis. Add to the aliquot in a 500 c.c. separatory funnel, 20 c.c. of citric acid (20 per cent w/v) and 8 gm. of sodium hexametaphosphate, make this solution just alkaline with ammonium hydroxide, and add 10 c.c. of potassium cyanide solution (10 per cent w/v). Extract with small portions of dithizone (diphenylthiocarbazone) solution in chloroform (0.05 per cent w/v) until the color of one portion remains unchanged. Drain the successive chloroform extracts into a smaller separatory funnel containing 20 c.c. of ammonium hydroxide (1 + 99), and shake as a means of washing the chloroform. When the extraction is complete, drain the combined portions of dithizone-chloroform solution (containing the lead) into a 150 c.c. beaker and evaporate to dryness over a steam bath. After the chloroform has been completely evaporated, add 2 c.c. of concentrated nitric acid, place a watch glass over the beaker, and boil until the gases evolved are colorless. Dilute to about 100 c.c., heat to 75° to 85° C., add 2 c.c. of a saturated solution of potassium dichromate, and electrolyze (maintaining the stated temperature) with 80—90 milliamperes for 20 minutes, using a small 1" by 5/16" rotating cylindrical platinum-gauze electrode. Dissolve the lead peroxide in a mixture of 2 c.c. of potassium iodide (2 per cent w/v) and 4 c.c. of acid sodium acetate solution (20 c.c. of saturated solution sodium acetate, 10 c.c. of glacial acetic acid, and 70 c.c. of water). Titrate with approximately

* This compound is available commercially as a detergent, manufactured by Calgon, Inc., Pittsburgh, Pa.

0.001 N sodium thiosulphate* that has previously been standardized against a known amount of lead.

Since no considerable quantity of tobacco that was known to be free from lead arsenate spray residue could be obtained, it was necessary to judge the results from this method by the difference between two otherwise identical samples, to one of which a known amount of lead had been added. Recoveries of only 90 per cent were obtained, and repeated efforts to improve this recovery failed. In an attempt to trace the source of loss of the 10 per cent of lead in the samples, the lead was added after filtration, when all the silica had been filtered off, instead of before mushing. When the lead was added at this stage, the analyses showed a 99 per cent recovery. This places the cause of the loss on some of the insoluble material, which contains for the most part silica and organic matter. Silica has given trouble in other methods that have been tried and is thought to be responsible here. As the time that could be devoted to the study was limited, the results are offered subject to this limitation. Although arsenic was not of primary interest here, it was determined in all samples to confirm the belief that the lead originated in the insecticidal lead arsenate used on the tobacco. The method used was that developed by C. R. Gross.[6] The results for both lead and arsenic are given in Table I.

TABLE I

LEAD AND ARSENIC IN CHEWING TOBACCO AND SNUFF

Sample	Pb* Gr./lb.	As_2O_3* Gr./lb.	Ratio Pb/As_2O_3
Chewing Tobaccos			
1	0.058	0.074	0.8:1
4	0.181	0.093	1.9:1
5	0.129	0.216	0.6:1
6	0.610	0.261	2.3:1
7	0.025	0.029	0.9:1
8	0.065	0.036	1.8:1
9	0.125	0.126	1.0:1
10	0.060	0.148	0.4:1
11	0.045	0.113	0.4:1
Snuffs			
12	0.088	0.035	2.5:1
13	0.388	0.189	2.0:1
14	0.935	0.364	2.6:1
15	0.500	0.224	2.2:1
16	0.194	0.116	1.7:1
17	0.711	0.303	2.3:1
18	0.853	0.315	2.7:1

* Calculated on basis of samples as received

If lead arsenate were the only source of contamination, the ratio Pb/As_2O_3 should be 2.1: 1. Many of the observed ratios approximate this value, and those that are lower might be due to the use of other arsenical insecticides in addition to lead arsenate.

The maximum figures for lead in chewing tobacco and snuff are equivalent to 85 and 131 p.p.m., respectively, both in excess of the 30 p.p.m. found by Bauer and Ropes in samples of snuff suspected by them of causing lead poisoning.

SUMMARY

A method for the determination of lead in tobacco has been worked out which yields a recovery of about 90 per cent. This procedure has been applied to 7 samples of snuff and 9 of chewing tobaccos. The amount of lead present ranged from 0.025 to 0.610 gr. per lb. (3.5 to 85 p.p.m.) in the chewing tobaccos and from 0.088 to 0.935 gr. per lb. (12 to 131 p.p.m.) in the snuffs. The arsenic trioxide content of the chewing tobaccos ranged from 0.029 to 0.261 gr. per lb. (4.1 to 36 p.p.m.) and of the snuffs from 0.035 to 0.364 gr. per lb. (4.9 to 51 p.p.m.).

* This very dilute thio may be protected from decomposition for several weeks by adding 1 per cent of amyl alcohol to the boiled water with which it is prepared.

From the Pb/As_2O_3 ratios found, it is probable that the presence of lead is due to dusting of the tobacco in the field with lead arsenate.

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Resolution Adopted by the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association, June, 1936

WHEREAS, at the annual meeting of the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association held at St. Louis, Mo., February 25, 1936, a presentation was made by Joel I. Connolly, of the Chicago Board of Health, relating to possible health hazards in apparently modern plumbing installations in public buildings, and

WHEREAS, it was manifest in the said presentation that plumbing fixtures which have been generally regarded as safe and sanitary in design may in fact constitute a real and serious health hazard by reason of the danger of back siphonage and contamination of water supply mains, and

WHEREAS, the probability exists that such apparently modern, safe, and sanitary plumbing installations may exist in numerous school building in the United States, and

WHEREAS, the existence of such apparently safe, modern and sanitary plumbing installations and reliance upon them brings about a sense of false security, therefore, be it

RESOLVED, by the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association that this Committee apprehends the possibility of danger to the health of school children from apparently safe, modern, and sanitary plumbing installations in school buildings, and be it further

RESOLVED, that the said Joint Committee earnestly recommends to all school boards and school executives that surveys be instituted by competent engineers to ascertain whether or not the danger of back siphonage and consequent pollution of water supply mains exist in plumbing installations within their jurisdictions, and that such surveys be followed by prompt corrective measures, and be it further

RESOLVED, that these resolutions be offered for publication to all journals dealing with public health, health education and general education.

Factors Influencing the Vitamin C Content of Vegetables*†

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FRESH raw vegetables have long been known to possess antiscorbutic properties. In 1747 James Lind, a surgeon of the British Navy, indicated that scurvy could be cured by the eating of green vegetables. In 1912 Holst and Frölich demonstrated that experimental scurvy in guinea pigs could be cured by the addition of small amounts of cabbage, turnips, or dandelion to the vitamin C deficient diet. There is little agreement, however, concerning the amount of vitamin C contained in a given vegetable. In a recent survey of the literature relating to the vitamin C content of spinach,[1] we have found that the amount of ascorbic acid reported by various workers ranged from 0.07 to 0.62 mg. per gm. of spinach. These calculations are based upon the assumption that 0.5 mg. of ascorbic acid per day is required for protection of a guinea pig from scurvy (Bessey and King[2]). Similar variations in the reported ascorbic acid content of most other vegetables may be noted.

While variations in technic employed in making the vitamin C estimations may account for some of the differences in the results obtained, it is probable that each of the common vegetables does vary widely in ascorbic acid content.

Variety,[1, 2, 3] freshness,[1, 2, 4, 5] and maturity [1, 2, 4] have already been indicated as factors affecting the vitamin C content of vegetables. However, no one has carried out sufficiently detailed studies of the ascorbic acid content of the different vegetables to show the relative influence of these and other factors.

Von Hahn and Görbing [6] and others have suggested that the nature of the fertilizer has an influence on the ascorbic acid content of the vegetable produced.

There is little agreement among workers as to the effect of open kettle cooking on the vitamin C potency of vegetables. Similarly, the extent of loss of this vitamin during preparation for freezing has not been definitely defined, although Fellers [7] has conducted preliminary experiments along this line.

Because of the lack of exact knowledge on the points mentioned above, a detailed study of these and other factors affecting the ascorbic acid content of vegetables has been begun in our laboratories. Thus far, the vitamin

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* Approved by the Director of the New York State Agricultural Experiment Station for publication as Journal Paper No. 131. March 18, 1936.
† Presented before the Third Annual Meeting of the American Institute of Nutrition at Washington. D. C., March 25, 1936.

TABLE I

ASCORBIC ACID CONTENT OF DIFFERENT VARIETIES OF VEGETABLES HARVESTED AT THE SAME STAGE OF MATURITY

	No. of Varieties	*Ascorbic Acid in Mg. per Gm. of Vegetable* — *Maximum*	*Minimum*	*Average*
Rhubarb	2	0.16	0.13	0.15
Peas	18	0.40	0.18	0.27
String Beans	10	0.24	0.09	0.18
Tomatoes	8	0.31	0.16	0.22
Cabbage	4	0.38	0.22	0.31
Spring Spinach (on muck soil)	12	0.62	0.38	0.49
(on upland soil)	12	0.89	0.53	0.73
Fall Spinach (on muck soil)	12	0.67	0.48	0.60
(on upland soil)	11	1.13	0.72	0.99

C content of spinach, rhubarb, peas, snap beans, cabbage, and tomatoes has been considered.

METHODS USED

The method of determining ascorbic acid described by Bessey and King[2] was employed in the examination of spinach, rhubarb, and peas. In determining the ascorbic acid content of snap beans and cabbage, the acetic acid solution used for extraction according to the above procedure was replaced by a mixture of acids, 1 N with respect to sulphuric and N/4 with respect to metaphosphoric. This solution has been found to give a more complete extraction of the ascorbic acid, and, moreover, the metaphosphoric acid prevents loss by catalytic oxidation. The details of the procedure employed are being published in another paper.

Representative samples of spinach, peas, snap beans, and cabbage, analyzed by the indophenol titration method have been checked by bioassays according to the procedure described by Tressler, Mack, and King.[1] In general, the results obtained by the two methods agree closely.

VARIETY STUDIES

A general resumé of our variety studies is presented in Table I. From these data it is seen that variety is a factor of considerable importance in the case of peas, snap beans, tomatoes, cabbage, and spinach. However, there was little difference in the ascorbic acid content of the two varieties of rhubarb examined.

In general, small-seeded peas, such as the Alaska variety, were found to have approximately one-half more ascorbic acid than the large seeded varieties.

The Georgian and Blue Lake varieties of snap beans contain only approximately one-half the amount of vitamin C found in the Tendergreen, Kidney Wax, Ideal Market, and Kentucky Wonder varieties.

The Golden Queen and Early Detroit tomatoes had a much higher ascorbic acid content than the other varieties examined.

The Princess Juliana and King of Denmark varieties of spinach were found to be lower in ascorbic acid than the other ten varieties grown in the spring, containing only about three-fourths as much as the Eskimo, Old Dominion, and Nobel varieties. This same relation did not hold in the case of the autumn spinach grown on muck soil.

TABLE II

ASCORBIC ACID CONTENT OF THE LEAVES OF SEVERAL VARIETIES OF SPINACH GROWN IN SPRING AND AUTUMN ON DIFFERENT SOIL TYPES

	Ascorbic Acid in Mg. per Gm. of Spinach Grown in			
	Spring		*Autumn*	
Variety	*On Muck Soil*	*On Upland Soil*	*On Muck Soil*	*On Upland Soil*
Eskimo	0.62	0.77	....	....
Viking	....	....	0.61	1.13
Virginia Savoy	0.48	0.80	0.67	1.05
Broad Flanders	0.49	0.89	0.56	1.13
Old Dominion	0.56	0.70	0.65	1.02
Nobel	0.55	0.79	0.53	1.07
Victoria	0.55	0.66	0.59	....
Viroflay	0.53	0.78	0.54	0.88
Hollandia	0.42	0.75	0.63	0.99
Long Standing Bloomsdale	0.49	0.74	0.55	0.80
Prickly Winter	0.46	0.75	0.48	0.95
King of Denmark	0.40	0.64	0.65	0.80
Princess Juliana	0.38	0.53	0.65	0.72
Mean	0.49	0.75	0.60	0.99

INFLUENCE OF GROWING CONDITIONS

This preliminary study of the vitamin C content of spring and autumn spinach grown on upland and muck soils has convinced us that, at least in the case of leafy vegetables, the soil on which they are grown, and growing conditions have a decided influence on the ascorbic acid content. The average amount of ascorbic acid in spinach leaves grown in the spring on upland soil was 50 per cent higher than that of the spinach from muck soil (Table II). The same statement is true for autumn spinach, but while the spring upland spinach averaged only about 0.73 mg. ascorbic acid per gm., the autumn upland spinach averaged 0.96 mg. per gm. Similarly, the spring muck spinach averaged 0.49 mg. ascorbic acid per gm. and the autumn muck spinach 0.60 mg. per gm. In other words, it appears that autumn spinach contains nearly a third more vitamin C than spring spinach. These conclusions are based upon the results of a single season's work. They will have to be verified in other years in order to be more certain of the validity of these findings.

MATURITY AS A FACTOR

Fully ripe tomatoes were found to be nearly twice as high in ascorbic acid as green tomatoes.

As green peas mature, the percen-

TABLE III

LOSS OF ASCORBIC ACID FROM SPINACH DURING STORAGE

		Number of Days' Storage			
Variety of Spinach	*Storage Temperature in Degrees C.*	*0 Mg. per Gm.*	*3 Mg. per Gm.*	*7 Mg. per Gm.*	*17 Mg. per Gm.*
Prickly Winter	1 to 3	0.78	0.76	0.72	0.39
" "	23 to 26	0.78	0.44	0.05	Spoiled
Hollandia	1 to 3	0.79	0.76	0.64	0.49
"	23 to 26	0.79	0.39	0.03	Spoiled

tage of ascorbic acid decreases, probably because of the rapidly increasing dry matter content and lowered respiration.

In the case of spinach, snap beans, and rhubarb, the percentage of ascorbic acid was approximately the same at all of the stages of maturity at which these vegetables were examined.

LOSS OF VITAMIN C DURING STORAGE

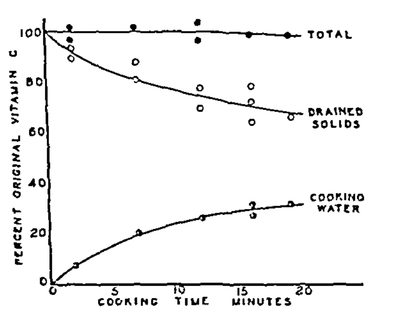
Freshly harvested spinach on standing for 3 days at room temperature lost approximately one-half of its ascorbic acid (Table III). But after 3 days' storage at 1 to 3° C., the spinach was found to retain practically all of its vitamin C. A similar result was obtained with snap beans and green peas.

On the other hand, the more acidic vegetables, rhubarb and tomatoes, lost very little ascorbic acid even when held at room temperature for a week.

EFFECT OF COOKING

Preliminary cooking studies conducted on peas, snap beans, and cabbage indicate that a considerable proportion of the ascorbic acid passes into the water during the boiling of vegetables, but the total amount of ascorbic acid decreases but little. In the case of boiling of snap beans (Figure I), approximately one-third of the vitamin C dissolved in the cooking water in 20 minutes' time, but the actual destruction of this vitamin was on the average less than 10 per cent of the total present.

FIGURE I



THE EFFECT OF COOKING ON THE VITAMIN C CONTENT OF STRING BEANS

PREPARATION OF VEGETABLES FOR FREEZING

Preliminary studies on the losses of vitamin C during preparation for freezing, freezing, cold storage, and thawing of peas have shown that blanching, sufficient to inactivate catalase, is necessary in preparing vegetables for freezing in order to eliminate loss of ascorbic acid during storage of the frozen vegetables at the temperatures commonly employed commercially (—18 to —9° C.).

During blanching of peas there is some loss of ascorbic acid. This varies from 10 to 30 per cent depending upon the type and severity of the blanching treatment. Water blanching causes a slightly greater loss of ascorbic acid than steam blanching, probably because some of it is dissolved by the blanching water.

Thawed vegetables gradually lose their vitamin C. This indicates the value of cooking without preliminary defrosting.

PUBLIC HEALTH SIGNIFICANCE OF THESE FINDINGS

The fact that certain varieties of tomatoes contain 50 per cent more vitamin C than others indicates clearly that packers of this juice should give more attention to the varieties grown. Canners of spinach attempting to obtain a canned product of high vitamin C potency should consider not only the variety, but also the season, and the soil on which their raw material is grown.

Since certain vegetables lose half their vitamin C content when held at room temperatures for 3 days, and since the rate of loss is much lower when

they are refrigerated, the necessity of prompt cooling of all except the more acidic vegetables, such as tomatoes and rhubarb, is obvious if their full nutritive values are to be retained. These studies should be continued in order to determine the optimum conditions of storage of all vegetables necessary to obtain the maximum retention of nutrients.

Of still greater significance, from the standpoint of public health, are the observations that, contrary to the general belief, but little vitamin C is destroyed during cooking. It is probable that this idea became prevalent because but few nutritional investigators took into consideration the amount of this vitamin which dissolved in the cooking water. The fact that the water in which vegetables, rich in vitamin C, have been cooked may be as rich in this vitamin as tomato juice is of great importance. It is evident that methods of cookery should be adopted which will make use of this nutritionally valuable substance which is too often discarded.

SUMMARY AND CONCLUSIONS

Variety is a factor of considerable importance in determining the ascorbic acid content of peas, snap beans, tomatoes, cabbage, and spinach.

Soil and growing conditions affect the vitamin C content of spinach.

The ascorbic acid content of tomatoes increases as they ripen. On the other hand, the percentage of vitamin C in peas decreases as they mature.

Snap beans, peas, and spinach rapidly lose ascorbic acid if held at room temperature. Refrigeration greatly reduces the rate of loss.

Preliminary cooking studies indicate that a considerable proportion of the ascorbic acid passes into the water during cooking by boiling, but the total amount decreases relatively little.

Blanching is necessary in preparing vegetables for freezing, in order to retain the ascorbic acid content of the frozen vegetables at the usual cold storage temperatures. Thawed vegetables slowly lose vitamin C.

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Use of Nigrosine to Demonstrate Treponema Pallidum in Syphilitic Lesions

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AS spirochetes are notoriously difficult to stain, the characteristic morphology of *Treponema pallidum* can best be demonstrated by darkfield illumination or by methods which stain the background, leaving the organisms colorless. Many agents have been used for the purpose of staining the background, such as India ink, collargol and Congo-red. We find that nigrosine * is far superior to any agent used for this particular purpose as it is highly colloidal and when the smear is properly prepared the spirochetes may be easily detected and are characteristically pictured.

The detection of the spirochetes (*T. pallida*) is of diagnostic value in the recognition of doubtful cases of syphilis and is a factor of considerable importance in the relation to early diagnosis. Successful results depend upon the selection of the most suitable material for examination and the most suitable method of collection. We suggest that the primary ulcer and papules be thoroughly cleansed with soap and water and the surface rubbed dry with a sterile pad. The ulcer should then be squeezed so that a clear exudate is extruded from the lower layers of the induration. For the examination of glandular fluid it is advisable to puncture the enlarged gland by means of a sterile syringe and obtain sufficient quantity of tissue fluid from the glands by aspiration, perhaps assisted by light massage. According to the investigations of Hoffman and Lipschutz,[1] the peripheral portions of the glands contain the spirochetes in greater numbers than the central portions.

METHOD FOR STAINING

Wet Preparation—A small loopful of the exudate is placed on a clean slide and to this is added a loopful of a 5 per cent aqueous solution of nigrosine to which ½ per cent formalin has been added as a preservative. The material is thoroughly mixed and spread over the slide until the proper thinness is obtained. In mixing the material one usually gets satisfactory thinness by starting in the center of the drop and by rotary movements gradually increase the size of the smear by spreading out from the center. In this way some portion of the smear will be ideal for

* Nigrosine (synonyms: nigrosin W. Gray R, B, BB. Silver gray. Steel gray. Indulin black) is not a pure dye, but is a mixture, and apparently the composition of different lots may vary. Ordinarily it is a mixture of a blue-black or violet indulin with a yellow dye in such a proportion that the resulting blend appears black. Our dye was obtained from Coleman and Bell.

TABLE I

COMPARATIVE RESULTS

Case No.	*Description*	*Kahn*	*Wassermann*	*Darkfield*	*Nigrosine*
1	Primary chancre—male	O	P	P	P
2	Primary chancre—male	O	P	P	P
3	Condyloma—female	O	P	O	P
4	Atypical lesion on penis	N	N	N	N
5	Aspirated bubo—male	O	P	N	P
6	Primary lesion on lip—male	O	O	P	P
7	Healing lesion on penis	O	P	O	P
8	Atypical lesion on penis	N	N	N	N
9	Atlanta—smear 22 days old	O	O	P	P
10	Atlanta—smear 6 days old	O	O	P	P
11	Atlanta—smear 2 days old	O	O	P	P
12	Aspirated bubo—male	O	P	O	P
13	Ulcer from broken down bubo	O	P	O	P
	Ulcer on penis	O	P	O	P
14	Atypical lesion on penis	N	N	N	N
15	Open ulcer on penis	P	P	O	P
16	Condyloma—female	P	P	O	P
17	Lip chancre—female	O	O	P	P
18	Atlanta—smear 3– days old	O	O	P	P
19	Atlanta—smear 26 days old	O	O	P	P
20	Atlanta—smear 20 days old	O	O	P	P
21	St. Louis—smear 45 days old	N	P	P	P
22	St. Louis—smear 45 days old	O	O	P	P
23	St. Louis—smear 35 days old	P	O	P	P
24	St. Louis—smear 20 days old	P	O	P	P
25	St. Louis—smear 18 days old	N	O	P	P
26	St. Louis—smear 18 days old	P	O	N	N
27	St. Louis—smear 17 days old	P	O	P	P
28	St. Louis—smear 11 days old	P	O	P	N *
29	St. Louis—smear 7 days old	P	O	P	P
30	St. Louis—smear 4 days old	P	O	P	P

P—Positive; N—Negative; O—No test made

* In this particular slide spirochetes were seen but their morphology was not typical of *Treponema pallidum*.

examination. When the proper thinness is obtained the slide is passed over the flame to dry the preparation rapidly. A drop of oil is placed directly on the dried smear and examined under the oil immersion objective. A good substage lamp should be used so that the field is properly illuminated. If the slide is to be used for future reference, the oil is best removed by immersing it in a coplin jar of xylol for a few minutes. One should not blot the excess oil because any rubbing will cause scratches on the preparation.*

Dry Smear—A drop of the exudate may be left to air-dry on the slide. At some later date place a small loopful of water on the dried area, allow to remain a few seconds to dissolve the exudate, and then place a loopful of nigrosine, smear, and dry. In this manner we have obtained excellent results from preparations sent to us from different laboratories. In several cases the exudate had been dried on the slide

* We would suggest to anyone using this method of demonstrating the presence of spirochetes to try staining the spirochetes from the mouth so that one may learn the proper thinness of the smear to detect more easily the presence of spirochetes.

45 days before we applied the nigrosine stain. This method of sending dried smears into the laboratory would be much simpler and probably more satisfactory than the present method of rushing a saline exudate in a sealed tube to the laboratory for diagnosis under the darkfield illumination. The sooner, however, the smear is redissolved and stained, the better the *Treponema pallida* stand out against the dark background.

RESULTS

1. This method of demonstrating the presence of *Treponema pallidum* in primary ulcers and papules has been successful in all but 1 case in which either the darkfield examination or the serology was positive for syphilis. In 1 case the nigrosine preparation was positive and the darkfield negative. The serum from this patient later gave a positive Wassermann reaction.

2. This method would simplify the present one used in most state laboratories for the diagnosis of syphilis as the dried exudate could be sent to the laboratory on a slide and a satisfactory diagnosis made from this. In 12 out of 13 smears our findings checked with the darkfield examinations made in other laboratories. Some of these smears were 45 days old before being stained with the nigrosine.

3. This method is much simpler and apparently as accurate as the darkfield examination.

REFERENCE

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NOTE: The authors wish to express their thanks to Dr. J. W. Brittingham, University Hospital, Augusta; to Dr. J. C. Willett, Chief of the City Laboratories, St. Louis; and to Dr. E. J. Sunkes, State Department of Health, Atlanta, for their valuable assistance in this work.

Epidemiological Features of a Typhoid Fever Outbreak in West Philadelphia Following a Supper

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THE great reduction in typhoid fever which has taken place during the past few decades represents an achievement in preventive medicine of which sanitarians and health officials alike are proud. Philadelphia has been congratulating herself upon the steadily declining case and death rates of this disease, which in 1933 reached a minimum of 105 cases, and a death rate of 0.6 per 100,000, thereby winning second honor among the metropolitan cities of the country. Contrast these figures with those for 1906 when 9,712 cases and 1,063 deaths were reported. However, this occurred before the days of filtration and chlorination in 1913, when Philadelphia was widely known as a typhoid city.

As a further safeguard against the dissemination of this disease, the Board of Health in 1914 promulgated compulsory pasteurization of the city milk supply. Prior to pasteurization many of our local outbreaks were traced to milk infected by patients or carriers, including 46 cases in 1906, 25 in 1908, and 149 in 1912.

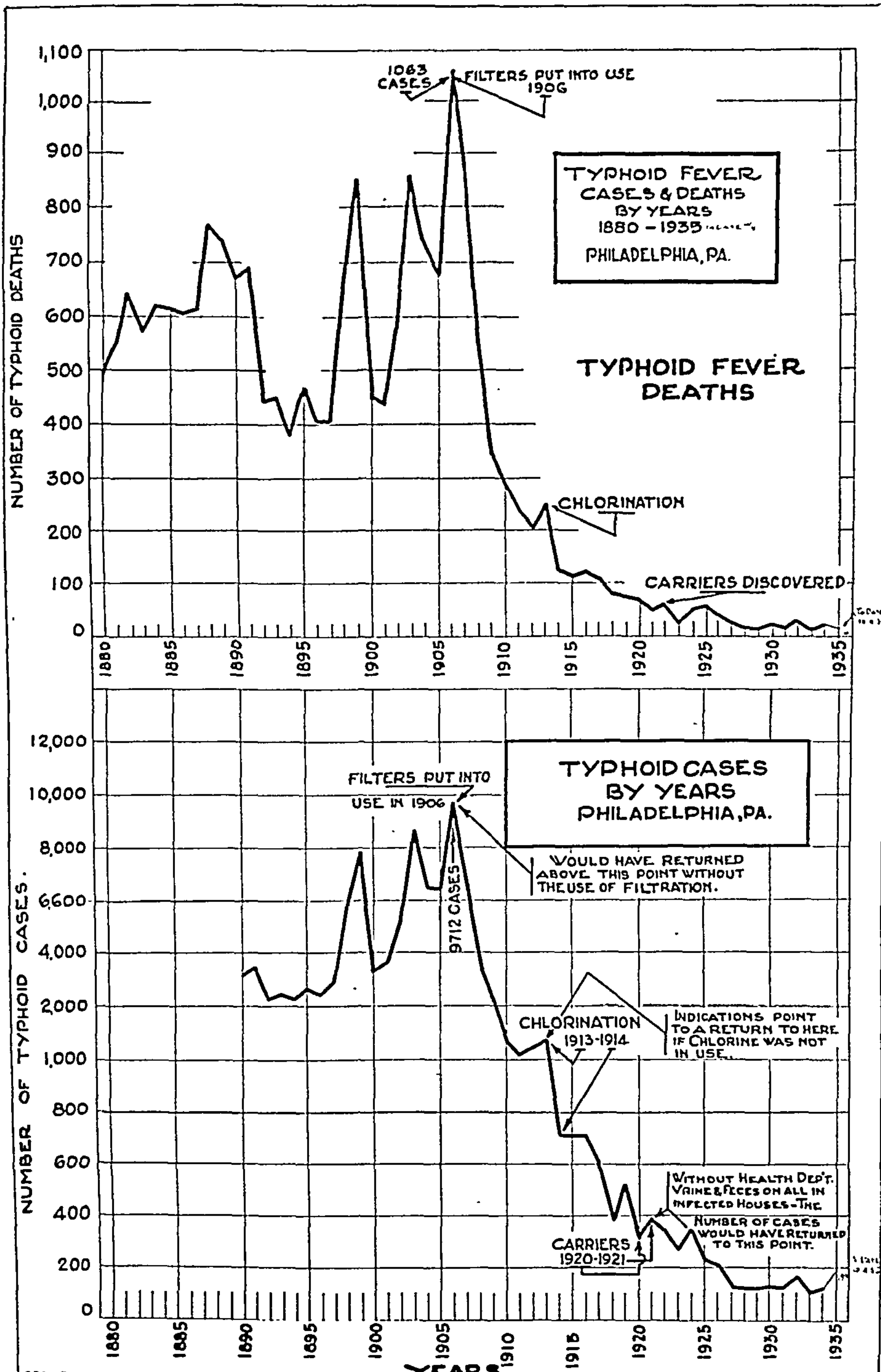
After the elimination of water and milk as major sources of infection, attention became centered on the prevention, detection, and control of chronic carriers, who in 1922 were placed under the jurisdiction of the Department of Public Health. In this same year a striking example of a carrier infection occurred in the home of a physician when 3 of his family were infected by the cook. This same carrier before recognition, had conducted an oyster saloon in South Philadelphia, and, in working back, is regarded as the probable source of infection in a number of obscure local outbreaks in this locality.

It would seem that, with the safeguarding of our water and food supplies, sanitary disposal of sewage, control of known cases and carriers, the further reduction in typhoid fever should be effected through epidemiological investigations of sporadic cases or epidemics, to discover carriers and prevent them from spreading the disease.

This recent outbreak is a reminder that the gains apparently made in the control of typhoid fever are still insecurely held and that only by contant vigilance and tireless investigation can the safeguards promulgated be applied and enforced.

HISTORY

A Memorial Day supper given by a Legion Post was attended by 264 patrons and guests: 228 of whom were Philadelphians, 110 males, 118 females



TYPHOID FEVER CASES & DEATHS BY YEARS 1880 – 1935
PHILADELPHIA, PA.
TYPHOID FEVER DEATHS
NUMBER OF TYPHOID DEATHS
1063 CASES
FILTERS PUT INTO USE 1906
CHLORINATION
CARRIERS DISCOVERED
TYPHOID CASES BY YEARS PHILADELPHIA, PA.
NUMBER OF TYPHOID CASES.
FILTERS PUT INTO USE IN 1906
9712 CASES
WOULD HAVE RETURNED ABOVE THIS POINT WITHOUT THE USE OF FILTRATION.
CHLORINATION 1913-1914
INDICATIONS POINT TO A RETURN TO HERE IF CHLORINE WAS NOT IN USE.
WITHOUT HEALTH DEP'T. URINE & FECES ON ALL IN INFECTED HOUSES - THE NUMBER OF CASES WOULD HAVE RETURNED TO THIS POINT.
CARRIERS 1920-1921
YEARS
35346
10-7-35

—76 adults and 152 children. There were approximately 36 persons living in townships adjacent to Philadelphia who attended the supper.

The epidemic began with 2 cases of typhoid fever, mother and child, living in West Philadelphia, reported June 18, 1935, from a hospital. Following the routine investigation by our medical inspector it was learned that the mother and child had visited various places including the Post supper, and that the mother had been drinking spring water at her place of employment.

On June 20, 2 children living in the neighborhood of the first patients were taken to a Delaware County hospital, with suspected typhoid—diagnosis confirmed later. The following day 3 other children in the same neighborhood were reported as having typhoid by the attending physician. All the patients gave a common history of having attended the supper at the Post.

By elimination of other sources of infection the supper seemed potentially the most incriminated, and an investigation of all food and drink served, as well as of all persons who prepared and handled it, was immediately undertaken. The sanitation, plumbing, and water supply were checked by the Division of Sanitation. Coincidently, all physicians and hospitals in the region involved, were notified by telephone to be on the lookout for suspected cases of typhoid fever, and warned of the possibility of an epidemic.

On June 21, a list of all who attended the supper was obtained from the officers of the Legion, and divided among 5 inspectors who immediately started to visit all of the homes involved, inquired regarding any past or present illness, the type of food eaten, whether any one handled or prepared food or drink served, whether accompanied by guests, and urged typhoid immunization by the family physician or Department of Public Health.

All those who supplied or handled food or drink at the supper were sent to the Laboratory of Hygiene to submit blood for Widals, and urine and feces for bacteriological examination. On June 23, 7 were sent to the laboratory, and thereafter 7 daily until all, numbering 44—20 food servers and 24 employed in 8 stores supplying food—had reported. Many found negative were required to submit 2 additional consecutive negative specimens.

The following foods were served: home-made potato-salad, cold boiled ham, olives, pickles, boiled eggs, butter, tomatoes, lettuce, home-made cakes, cheese, ice cream, bread and rolls; with beer, soda water, coffee, cream for coffee, and city tap water. Each article of food was investigated individually.

The bulk of the food was supplied by one grocer, who, with 3 employees, was among the first to submit specimens at the laboratory. The potato-salad, which from the first was under suspicion, was made by these 4 persons.

June 23 and 24, 13 additional cases, with histories of having attended the supper and of having partaken of the potato-salad, were reported to the department.

The Post supper was served with 150 lb. of potato-salad, and a few pounds of the same batch were sold over the counter to customers. Only 1 family, mother and daughter, could be located, who, on May 30, purchased some potato-salad and were subsequently taken ill with typhoid fever and hospitalized. They did not attend the supper.

On June 22, it was learned that a portion of potato-salad left over from the supper had been stored in the icebox of the Legion Post House, and on May 31, was given to a man, the father of 6 children none of whom had attended the supper. The father, mother, and 1 child ate the salad. The mother and child came down with typhoid, the

father escaping. Attention was focused on the potato-salad as the source of infection, since all patients, including children, gave histories of having eaten it.

On June 25, the laboratory reported as positive the urine and feces of a woman who was one of the 4 who prepared the potato-salad. This person was removed to the Philadelphia Hospital for Contagious Diseases, and 2 additional successive positive cultures on feces, and 2 on successive biliary drainages were reported by the Laboratory of Hygiene.

On June 28, a positive fecal culture was obtained on a second woman who assisted in serving food at the supper. She too was removed to the hospital, and 2 additional positives on feces and bile were obtained. Both gave positive Widal reactions, Carrier No. 1, 1–60 dilution, and Carrier No. 2, 1–300.

Following a careful investigation of the duties at the supper of Carrier No. 2, which consisted in passing trays without directly handling food, this department felt that she could be definitely eliminated as the source of infection, and was convinced that Carrier No. 1 was the true source.

A brief social and medical history of this carrier follows:

Carrier No. 1—She is white, born in Germany, 58 years old, weighing 185 lb., and has lived at the grocery noted, for the past 25 years. There is a history of illness 8 years ago when she was confined to bed for a period of 2 to 3 weeks, with fever and occasional delirium. The attending physician recalls treating this patient, but has a hazy recollection as to the nature of her illness. She claims to have previously prepared potato-salad in the same German way, and rarely prepared other foods, but usually waited on customers at the grocery. Apparently she is an intermittent type of chronic carrier, but in the preparation of this particular lot of potato-salad evidently introduced a virulent organism in massive dosage.

Our typhoid incidence in the city ward in which the grocery is located, shows that only 10 of 23 cases reported from 1928 to onset of recent outbreak could not be definitely traced. Whether or not she was responsible for any of the 10 cannot be determined.

After her discharge from the Philadelphia Hospital for Contagious Diseases she was admitted to one of our Philadelphia hospitals where she was studied preliminary to a contemplated cholecystectomy for the carrier condition. The laboratory findings paralleled those previously found. Cultures taken of material under nail of third finger, left hand, and from skin folds about anus and cleft of buttocks, were positive. On July 18, a cholecystectomy was performed, and bile ducts injected with 1 per cent pyoktanin. One large gall stone was found in gall-bladder, the mucosa of which was thickened and inflamed showing fibroid changes, and was positive for *B. typhosus*. The free bile and inspissated bile covering calculus gave pure cultures. Five days after operation, cultures of urine and feces were negative. Patient was discharged August 13, and since has had 3 positive and 1 negative cultures from fecal specimens. She is not living at the grocery, and is under observation of the Department of Public Health conforming to rules and regulations governing chronic typhoid carriers.

The greatest number of cases reported in a single day was 25 on June 27, and the last was reported on July 31, totaling 86 cases with 6 deaths, a case death rate of 7 per cent (see Table I).

Every effort was made to hospitalize cases, and immunize contacts. There were 31 cases admitted to the Philadelphia Hospital for Contagious Diseases, 35 at the Philadelphia General Hospital, 17 at other Philadelphia hospitals, and 3 remained at home, a total of 83 or 96.5 per cent hospitalized. There were 2 instances in which 5 cases occurred in one house; 6 primary and 4 secondary. There were 242 persons immunized at the Post headquarters by 7 medical inspectors who functioned one evening each week for 4 consecutive weeks. This number does not include those immunized by the attending physicians of whom we have no accurate record. There were 145 homes visited by our inspectors,

TABLE I

WEST PHILADELPHIA EPIDEMIC—TYPHOID FEVER, 1935

86 CASES—6 DEATHS

Cases—Age Groups

	1–5 Years	6–10 Years	11–15 Years	16–20 Years	21–30 Years	31–40 Years	41–50 Years	Over 50 Years	Total	Sex Percentage
Male	1	13	14	2	0	1	3	1	35	41
Female	3	15	12	4	2	9	6	0	51	59
Case total	4	28	26	6	2	10	9	1	86	
Case percentage	4.7	32.6	30.3	6.9	2.4	11.6	10.4	1.1	100	

Deaths—Age Groups

	1–5 Years	6–10 Years	11–15 Years	16–20 Years	21–30 Years	31–40 Years	41–50 Years	Over 50 Years	Total	Sex Percentage
Male	0	0	3	0	0	1	0	0	4	66.7
Female	0	0	0	1	0	0	1	0	2	33.3
	0	0	3	1	0	1	1	0	6	

and approximately 5,000 visits made by them. Every house was visited daily for 10 days, then every other day for 6 days, and 2 final visits thereafter, making 15 visits to every house over a period of 3 weeks. There were 9 secondary cases.

The addresses of known out of town contacts and patrons attending the supper were forwarded to respective health officers for investigation and observation. We have no accurate record of how many such cases developed typhoid, but know of at least 6.

SUMMARY

1. Description of a serious outbreak of typhoid fever among patrons and guests attending a supper given in honor of an American Legion Post.

2. The promptness of discovery of a chronic typhoid carrier in the rôle of a food handler who contaminated potato-salad which caused the outbreak, and the discovery of the source of the epidemic within 5 days after the first case was reported to the Department of Public Health.

3. The efficiency and promptness with which cases were discovered and hospitalized, and contacts safeguarded and immunized.

4. The earnest coöperation received from physicians, hospitals, Post officials, and the laity in the control and abatement of this epidemic.

5. The present-day status of the chronic typhoid carrier in the incidence of typhoid fever, and the carrier problem as a perplexing factor to public health administration.

Procedures Employed by the Laboratories of the Departments of Health in the Various States and Some of the Larger Cities of the United States in the Sero-Diagnosis of Syphilis as of December, 1935

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THE desire to ascertain the methods of procedure used in the sero-diagnosis of syphilis by the public health laboratories over the country, recently prompted the laboratory of the Georgia State Department of Health to send a questionnaire relating to this work to the departments of health of all the states and 15 of the larger cities.

Their coöperation in this study was splendid indeed as replies were received from all of them. A compilation of a portion of this information is presented below. The wording of the replies has been closely followed without assuming to name the procedures.

States	*Complement-Fixation*	*Precipitation*	*Annual No. Specimens*
1. Alabama	Kolmer	Kahn	85,000
2. Arizona	No serological diagnosis of syphilis		
3. Arkansas	3 antigen-antisheep	Kline	20,000
4. California	Kolmer	Kahn	36,000
5. Colorado	None	Kahn	15,000
6. Connecticut	2% chol. ant. 4 hr. fixation in refrig. sheep hem. system	Kahn	50,000
7. Delaware	Kolmer	Kahn	6,100
8. Florida	None	Kahn	132,000
9. Georgia	Kolmer	Kahn on request	75,000
10. Idaho	Kolmer	Kahn	18,000
11. Illinois	Kolmer on request	Kahn	100,000
12. Indiana	Kolmer	Kahn and Kline	49,000
13. Iowa	Kolmer	Kahn	39,000
14. Kansas	Kolmer	Kahn	30,000
15. Kentucky	Similar to Kolmer: multiple antigens used	Kahn technic using Kline antigen	65,000
16. Louisiana	Original Wassermann modified. Two antigens used	Kahn, Kline and Johns occasionally	10,000
17. Maine	None	Kahn	12,000
18. Maryland	Kolmer (quantitative)	Kahn	23,000
19. Massachusetts	None	Hinton	140,000

States	Complement-Fixation	Precipitation	Annual No. Specimens
20. Michigan	None	Kahn (standard and presumptive) Kline as supplementary	114,000
21. Minnesota	Kolmer	Kline	135,000
22. Mississippi	Old Hygienic Laboratory	Kline-Young	45,000
23. Missouri	None	Kahn	17,000
24. Montana	Kolmer	Kahn	13,000
25. Nebraska	Own modification	None	30,000
26. New Hampshire	Kolmer	Hinton	15,000
27. New Jersey	Modified Kolmer 4 hr. fixation in icebox	Kahn on positive Wassermann	50,000
28. New York	New York State Standardized method	Making comparative study of several	125,000
29. New Mexico	Kolmer	Kahn	20,000
30. Nevada	Kolmer	Kahn on request	4,000
31. North Carolina	New York City method of 1918	Meinicke	110,000
32. North Dakota	Kolmer	Kahn	6,500
33. Ohio	Kolmer (4 hr. fixation in icebox)	Kahn	82,500
34. Oklahoma	Modified Kolmer (Short incubation)	Kline	50,000
35. Oregon	None	Kahn Standard and Presumptive	12,000
36. Pennsylvania	Own modification	Kahn on request	80,000
37. Rhode Island	Kolmer	Kahn and Hinton	8,000
38. South Carolina	Wassermann Park and Williams: Pathogenic Organisms	Kahn	60,000
39. South Dakota	Own modification	Kahn	6,500
40. Tennessee	Kolmer	Kahn	40,000
41. Texas	Kolmer	Kahn	39,000
42. Utah	Kolmer	Kahn	9,000
43. Vermont	Modified New York City Method	None	6,000
44. Virginia	Craig (modified)	Kahn on request Routinely in Branch Laboratories	60,000
45. Washington	Kolmer	Kahn	24,000
46. West Virginia	Kolmer (check in doubtful cases; Colloidal gold on spinal fluids)	Kahn	44,000
47. Wisconsin	Own modification	None	120,000
48. Wyoming	No state laboratory		
49. Army Med. School	Craig modification	Kahn	18,000
50. Navy Med. School	Neil modification	Kahn Kahn official test for Navy	3,600

Cities	Complement-Fixation	Precipitation	Annual No. Specimens
1. Baltimore	Modified Wassermann (not specified)	Kahn when indicated	25,000
2. Boston	Wassermann (not specified; two antigens used)	Kahn and Hinton on request	15,000
3. Buffalo	N. Y. State standardized method approved	Kahn and Kline on request	40,000

Cities	*Complement-Fixation*	*Precipitation*	*Annual No. Specimens*
4. Chicago	Wassermann (not specified)	Kahn	57,000
5. Cincinnati	Wassermann (not specified; icebox fixation)	Kahn	12,000
6. Cleveland	None	Kline and Young, and Kahn	20,000
7. Detroit	None	Kahn (standard and presumptive)	45,000
8. Los Angeles	Kolmer	Kahn	26,000
9. Memphis	None	Kahn (Kline used as check)	40,000
10. New Orleans	Wassermann (not specified; two antigens used)	None	18,000
11. New York	New York State method	Kline	230,000
12. Philadelphia	Wassermann (not specified)	Kahn	25,000
13. Pittsburgh	Wassermann (not specified)	None	8,000
14. San Francisco	Kolmer	Kahn	34,000
15. St. Louis	None	Kahn	32,000

This study embraces the activities of the laboratories of 46 of the states and 15 of the larger cities, together with the Medical Schools of the Army and Navy, in the serology of syphilis on nearly 3 million specimens annually. Two states do not offer this service.

Eleven of these 63 laboratories, representing 579,000 specimens, are using flocculation tests only, and 5 representing 182,000 specimens are using the complement-fixation test only. Both kinds of tests are employed in 47 in the examination of 2,038,000 specimens.

Twenty-four of the laboratories using complement-fixation employ Kolmer's method, and 5 are using modifications thereof. The others are divided as follows: Method not specified, 11; own modification, 4; New York State Method, 3; Craig Modification, 2; Neil Modification, 1; original Wassermann modified, 1; Hygienic Laboratory Method, 1.

The Kahn test is relied upon alone in 8 laboratories and is used in 41 others of this group. The Kline test is employed in 10, Hinton in 3, and Meinicke in 1.

The combination of the Kolmer and Kahn methods is apparently the more popular, being employed in 25 of these laboratories.

Milwaukee's Well Advertised Gastrointestinal Epidemic

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DURING the end of March, 1936, Milwaukee received an unusual amount of publicity in the newspapers throughout the United States on account of an epidemic of gastrointestinal disease.

While the epidemic was very extensive, the estimate of 120,000 cases by a newspaper correspondent, was very generous. The 2 deaths which were announced in the newspapers, were not due to the epidemic, but to other more serious causes, although each death certificate did mention gastrointestinal influenza as the contributory cause. The epidemic was most noticeable among school children where the absenteeism increased from a normal of 5 per cent to 15 per cent over a period of 3 or 4 days. The majority of the adults who suffered from the ailment, were not sick enough to remain away from their regular occupation.

The symptoms usually started with nausea followed by vomiting and in most cases by diarrhea. Most persons felt relieved as soon as they had vomited. A few had fever and were compelled to remain in bed for 2 or 3 days. Such patients had the symptoms and appearance of what is commonly called la grippe. The symptoms in many patients were very similar to those present in an attack of acute food poisoning.

Nose and throat cultures of patients showed nothing abnormal. Stool examinations were not made because patients were not sick enough to go to hospitals nor sick long enough for the Health Department to make arrangements for the collecting of stools. According to the experience of others, such stool examinations probably would not have had any diagnostic value.

Some physicians reported an increase of appendicitis cases following the epidemic. Since appendicitis is not a reportable disease, there is no way of knowing how much of an increase occurred excepting as it is reflected in the mortality rate. Fifteen deaths from appendicitis were reported during the month of April, compared to a total of 22 for the 3 previous months, 5 for May, and an average of 7 deaths for April, during the last 5 years.

The Milwaukee epidemic was no different from other gastrointestinal disturbances occurring in other communities, with the probable exception that it was somewhat more extensive and explosive than is generally the case. However, due allowance must be made for the fact that other communities may not have had their epidemics during a bitter municipal election campaign and in that way escaped unnecessary publicity. The first reports to the Milwaukee Health Department of gastrointestinal disturbances came from pediatricians during the last week of February. They reported that babies and younger children were suffering from diarrhea. The city water at that time had a bacteria count of zero to

2 per c.c. with an occasional 10 c.c. tube showing gas in 48 hours, but no confirmation for *B. coli.* The water at this time had a bad taste and odor, which had never been noticeable before. The taste and odor were similar to those found in old shallow wells with decayed wooden casings. No turbidity was noticeable.

It was assumed that the melting of the winter's accumulation of snow and the breaking of the ice which had covered the lake for a long period, had something to do with the unusual taste and odor. The water showed a few algae which may have contributed to this unusual taste and odor. The Milwaukee River, which empties into Lake Michigan, about 4 miles south of the water intake, was very high the last part of February and the first part of March due to the spring thaw. The Sewage Disposal Plant, which treats all of Milwaukee's normal flow of sewage, discharges its effluent into Lake Michigan at the outlet of the Milwaukee River. Beginning with March many reports of gastrointestinal cases came to the Health Department from families which were inclined to blame the drinking water.

Since the drinking water showed absolutely no evidence of pollution, it was always defended by the Health Department. The complaints against the drinking water continued to increase gradually, even after the obnoxious taste and odor had disappeared. Nothing in the examination of either the raw or the chlorinated water, indicated any sign of pollution until the afternoon of March 24, when the bacteria count rose from an average of 3 per c.c. to 61 per c.c. with four of the five, 10 c.c. tubes showing gas in 48 hours. On March 25, the morning and afternoon bacteria counts were 52 and 84 respectively, with five 10 c.c. tubes showing 48 hour gas and confirming for *B. coli.* As soon as this report was available, which was on the morning of March 27, the public was notified of the situation and directed to boil the drinking water. On about the same day, the gastrointestinal cases increased to epidemic proportion. The peak of the epidemic as nearly as could be determined, occurred on March 30.

After March 27, the water began to improve very rapidly. On April 3, the bacteria count was 3 per c.c. and no gas in any of the tubes. The only confirmation for *B. coli* was three out of five and two out of five 10 c.c. tubes of the morning and afternoon samples of March 25. The order to boil the drinking water was not lifted until the morning of April 7, when the bacteria count was 1 per c.c. and there was no 48 hour gas in any 10 c.c. tubes.

Naturally, all during this time, the most important question to be answered by the Health Department was whether or not the drinking water was responsible for the epidemic. Circumstantial evidence certainly pointed toward the drinking water. The Health Department, after analyzing all of the various available evidence, decided that the drinking water was not responsible for the epidemic. This position, obviously, seemed very inconsistent to many people because it was difficult for them to understand why the Health Department's order to boil the drinking water and the epidemic appeared simultaneously, if there was no connection between the two.

The fact that some of Milwaukee's suburbs which had their own water supply, claimed to be free from the epidemic also made it very difficult to absolve Milwaukee's drinking water. Some of the reasons that prevented the Health Department from blaming the water when the epidemic first appeared are as follows:

1. Records show that the so-called gastrointestinal influenza appears periodically in every community and never has been related to any particular water supply.

2. Many gastrointestinal cases had been reported for weeks before the peak of the epidemic arrived and long before the drinking water showed any evidence of pollution. The fact that *B. coli* was present in the water for only 1 day when the epidemic began, scarcely seemed serious enough to warrant such an extensive outbreak of gastrointestinal trouble, especially when the bacteria count and turbidity were both very low and when chlorination was effective at all times.

3. Only rarely did several members of the same family become ill at the same time. Usually a day or two intervened as is the case when you have personal contact infection in homes.

4. The fact that other communities near Milwaukee having their own water supply reported no substantial increase in gastrointestinal ailments, was not given much consideration because Milwaukee has had other epidemics not in any way related to drinking water which other communities near Milwaukee escaped at least temporarily.

5. Reliable information from other cities showed that Milwaukee was not the only city experiencing an increase in gastrointestinal disease.

6. The Health Department knew of several persons who were very ill with the prevailing gastrointestinal disturbance, who stated positively that they had been drinking nothing but spring water for at least a week previous to their illness.

Additional reasons which have been established subsequent to the epidemic, that make it difficult to believe that the drinking water had anything to do with it, are as follows:

1. At least 6 large institutions in and outside of the city using city water, entirely escaped the epidemic due to their isolation. One orphanage with 250 children and 50 sisters, was entirely free from the ailment, although they all drank city water and did not boil it until requested to do so by the Health Department.

2. Several of the schools in the outlying districts were comparatively free from the disease due to their isolation.

3. The survey made by the Health Department nurses showed that families using spring water had just as high a percentage of gastrointestinal cases as those drinking lake water. They also obtained the information that at least 50 per cent of all patients interviewed, had contracted the disease 3 or more days after they had used nothing but boiled or spring water.

4. Although the Health Department nurses reported that 95 per cent of the people either boiled the water or drank only spring water on and after March 27, the peak of the epidemic was not reached as stated previously until March 30, and subsided gradually. Even as late as April 22, a considerable number of cases were reported in one school.

5. Only 3 typhoid fever cases were reported to the Health Department from January 1 to February 6. No case has been reported from February 7 to May 15. From January 1 to May 15 there have been only 6 deaths from gastroenteritis in children under 2 years of age, which is the lowest number of deaths for this period in the history of the Health Department.

6. Eye, ear, nose and throat specialists reported an increase following the intestinal epidemic, of otitis media and other ailments associated with upper respiratory infections.

When the drinking water is responsible for disease, health officers should not hesitate to admit it. On the other hand, we should not be willing to blame the drinking water merely because it appears to be the easiest way out of it. The average individual will nearly always blame something that he has drunk or eaten whenever he has some gastrointestinal disturbance, but that is no reason why the family physician or health officer should agree with such a diagnosis. Blaming the water supply of a community for an epidemic is a very serious matter and should only be done when the blame can be definitely established. If we are able to have periodic extensive epidemics of colds due to a virus, it is not difficult to believe that a virus may also be responsible for other types of epidemics.

Incidence and Severity of Hookworm Infestation in East Texas

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THE Hookworm, *Necator Americanus*, was first described by Stiles [1] in 1902. Following Stiles's discovery, a great deal of investigation was carried on by the International Health Board in the interest of public health and by Kofoid [2] in 1918 in the interest of the army. Since that time little investigation has been made in Texas, and only a few surveys have been completed in other southern states. The 1927 *Annual Report* of the International Health Board [3] stated that the hookworm problem in the South had been solved. Stiles [4] pointed out that this is a fundamental error, and is partly responsible for the lack of inquiry and lack of interest in this important field of parasitology.

Much more valuable work can now be done by use of newer methods. Some modifications of Kofoid's [5] or other salt flotation methods give a larger number of positives where the infestation is light. The newer methods of quantitative estimation by counting the number of eggs per gram of feces have enabled workers to tell whether the patients carry a small or large number of worms. While these newer findings are not directly comparable with the older, it is generally supposed that the degrees of infestation which are now found are on the whole lighter than those of 10 or 20 years ago; however, recent papers [6, 7, 8] do not support the conclusion that the hookworm problem is solved.

The present study was made during the winter months of 1932 and 1933 in 5 East Texas counties as given in Table I. Of 1,883 pupils examined, 1,751 were white and 132 colored. There were 614 whites, or 35 per cent, infested, but only 2, or 1.5 per cent, of the 132 colored. Of the total number examined, 27, or 1.4 per cent, were infested with dwarf tapeworm, *Hymenolepsis nana;* 12, or 0.6 per cent, were found to have a double infestation of these two parasites. Few other parasites were found.

Table I shows the percentage of infestation for each school district. The number examined in some was not large enough to be a very valuable index of that community. On the whole, the data agree with the findings of 20 years earlier in regard to geographical location, condition of soil, and higher or lower economic levels. The total average of 35 per cent infestation for the entire study of whites is somewhat deceiving, because some of the poorest sandy-land districts, located in the river bottoms or nearby, show as high as 80 per cent infestation for those examined. In the redland districts the infestation ran below 10 per cent in some cases. These districts have improved farms, little timber, and better living conditions, therefore a higher economic level.

Of the positive cases, 237 were studied by the Caldwell and Caldwell [9] Quantitative Method. Where the largest number of cases occur, more heavily infested cases are found. Where the percentage of cases is low, the infesta-

TABLE I

SUMMARY OF HOOKWORM EXAMINATIONS IN EAST TEXAS

During January, 1933, the Texas State Board of Health published in mimeograph form the following summary of the work done

Data for 1932

	Number Examined	*Hookworms Found*	*Percentage Infestation*
1 Negro school	132	2	1.5
5 town schools	353	37	10.0
16 rural schools	341	163	48.8
Total specimens examined	826		

About 2 per cent of *H. nana* found; less than 1 per cent all others

Data for 1933 and 1934

School	*County*	*Number Examined*	*Number Positive*	*Percentage of Positives*	
a	Angelina	40	6	15.0	
a	Nacogdoches	50	12	24.0	
b	"	21	11	52.3	
c	"	55	7	12.7	
a	Panola	14	1	7.1	
b	"	28	12	42.8	
c	"	53	30	56.6	
d	"	44	3	6.8	
e	"	14	9	6.4	2 dwarf tapeworms
f	"	45	1	0.2	3 dwarf tapeworms
g	"	5	1	2.0	
a	Sabine	62	52	83.8	Some are heavily infested
b	"	134	24	17.9	
c	"	88	30	34.0	7 dwarf tapeworms
d	"	28	14	5.0	
a	San Augustine	61	23	37.7	
b	" "	69	12	17.4	
c	" "	102	64	62.7	
d	" "	12	5	41.6	2 dwarf tapeworms
e	" "	46	39	84.6	Most infestations rather heavy
f	" "	31	11	35.4	
g	" "	49	13	26.5	
	Totals	1,151	390	33.9	

About 2 per cent of other parasites besides hookworms were found.

tion is very light to light. The methods of quantitative estimation have not found their way into general practice, and few of our state boards of health are now using these methods in their laboratories. Nevertheless, it is a very valuable bit of knowledge to the practising physician to know the degree of infestation, as light cases may be given only 1 or 2 treatments; whereas, heavy cases need further treatments. Where quantitative estimations are used, it might be well to reëxamine light cases after 1 treatment.

The accompanying data (Table I) contain a summary of the work done

in 1932, published in mimeograph form by the Texas State Board of Health, and a summary of work done in 1933 and 1934, giving the total number examined in each school district, the number of hookworm infestations, the percentages of infestations, and the number having dwarf-tapeworm, *Hymenolepsis nana.*

Analysis of degrees of infestations is given in summary only for all of the positive cases studied, as follows: Very light 54.2 per cent; light 27.9 per cent; moderate 16.9 per cent; and heavy 1.0 per cent.

There is no close agreement among quantitative workers about what constitutes the different groups of infestation. The divisions here are made according to the method of Smillie and Spencer [10] in their Alabama work. The first group, very light, contains all those who have an egg count per gram feces below 600, which indicates from 1 to 25 worms; the second group, light, has an egg count of from 600 to 2,099, which indicates from 26 to 100 worms; the third group, moderately infested, has 2,100 to 11,099 eggs per gram feces, which corresponds to 101 to 500 worms; the fourth group, heavily infested, runs from 11,100 or more eggs per gram of feces, and indicates over 500 worms. Chandler [11] states that it is better to report egg counts only than to report worm load, as the latter introduces another variable element. We have chosen to report both, for the purpose of general information.

These 4 classification groups give a valuable indication of the degree of infestation in the East Texas counties studied.. It is assumed by some that only light infestation still exists. In one school 12.5 per cent of the positives were heavily infested; in another, 44.7 per cent of the positives were moderate infestations. A large number of cases fall in the light and very light columns.

Investigators disagree on the amount of injury, mental and physical, done by the light and very light infestations. The writer is continuing a study of this problem, and will report later further findings on mental and physical retardation. Data on several hundred cases have been collected and will be analyzed and reported later.

It should be noted that this study has been made for scientific information and not for comparison between districts or counties. It indicates that widespread hookworm infestation exists in East Texas, that there is between 1.5 per cent and 2.0 per cent infestation of dwarf tapeworm, *Hymenolepsis nana,* and that a few children harbor both parasites.

The quantitative estimation of the degree of infestation adds important information concerning conditions in East Texas. It is hoped that this study may be an incentive for further work in solving the problem of intestinal parasites in East Texas and in all the southern states.

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A Meeker Burner With Auxiliary Flame For Bacteriological Use

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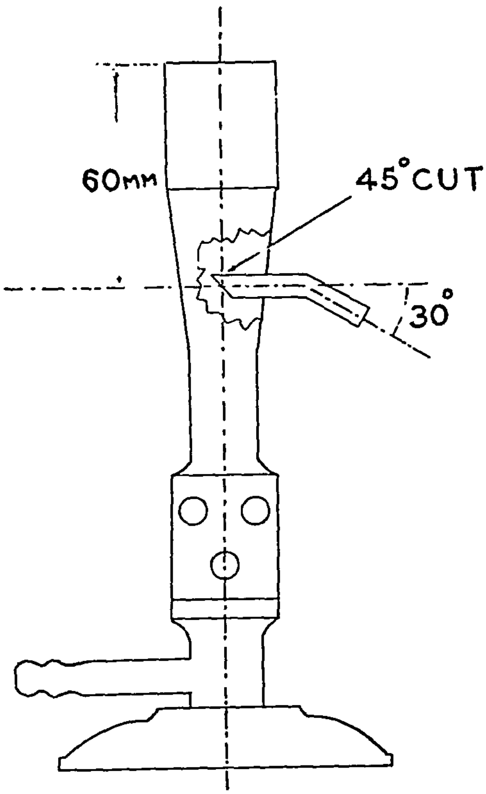
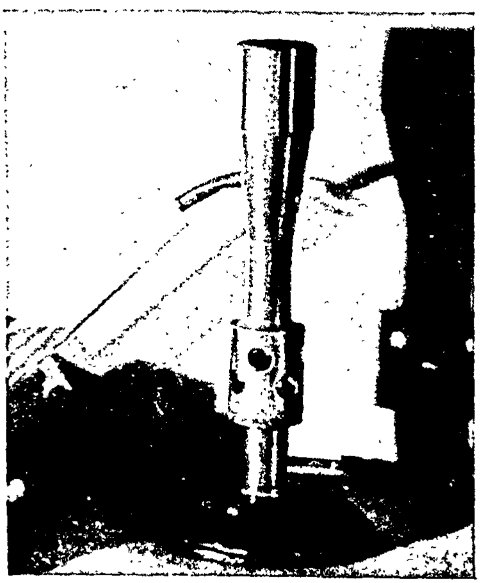
THE usual flaming of the mouth of a tube or flask containing bacteriological culture media will not satisfactorily remove the fibers of cotton which frequently adhere inside the neck during the tubing and sterilization. In work with pathogenic organisms, or in disinfectant testing, the infection of these fibers when the medium is inoculated offers a possibility of danger to the worker as well as inaccurate results in the experiment. An attachment of the type illustrated offers an easily constructed device for the burning of any cotton fibers inside the neck of a test tube or flask.

The burner is constructed from a Meeker burner and a short length of ¼″ copper or brass tubing. The piece of tubing should be about 3″ long, with one end cut perpendicular and the other at 45° to the axis. The tube is bent at an angle of 30° at about





1″ from the end in the manner shown in the diagram. The tube is soldered into a ¼″ hole in the burner about 2⅜″ from the top. The end cut at 45° should be at the center of the burner.

The side arm deflects a portion of the gas-air mixture which gives a flame similar to that of a microburner but deflected downward at an angle convenient for use. A small stopper or cap may be placed over this tube when the auxiliary flame is not desired.

Notes on Swimming Pool Sanitation Control

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THE sample collecting technic and and residual chlorine standards developed for better control and operation of swimming pools have undergone marked changes in the last few years. These changes were based upon experimental results and have now been included in the 1935 Report of the Joint Committees on Bathing Places of the American Public Health Association and the Conference of State Sanitary Engineers.[1] The important changes recommended are the use of sodium thiosulphate treated bottles for collecting swimming pool samples for laboratory analysis, and the maintenance of a minimum of 0.4 and 0.7 p.p.m. residual chlorine in the pool water during use, depending on whether chlorine or chloramine is used. It is presumed that those concerned with swimming pool sanitation will be interested in viewing critically the significance of these changes. To this end, the actual effect of these changes as reflected by the bacteriological results on samples collected from typical pools, indoor and outdoor, both modern and antiquated in construction and equipment, during a 2 year period of observation may be of interest.

Five 10 c.c. portions of each sample collected were examined for *B. coli*, partially confirmed on endo, and a plate count was made of each sample. All bacteriological analyses were made according to *Standard Methods*. A test for residual chlorine was made of pool water at the time each sample for bacteriological analysis was collected. The pH of the pool waters for the 2 year period was as follows: 55 per cent of pools averaged 8.0 to 8.4 pH, 42 per cent averaged 7.1 to 7.9 pH, and 3 per cent, or 1 pool, averaged 6.9 pH.

Preparations of the bottles for sampling was accomplished according to Option 1, Report of the Joint Committees in Bathing Places, except that sterile sodium thiosulphate solution was added aseptically after the bottles were sterilized.

During 1934–1935, 1,075 samples were collecetd from swimming pools in treated bottles, and an equal number were collected simultaneously in un-

TABLE I

THE INFLUENCE OF SODIUM THIOSULPHATE TREATED BOTTLES ON THE BACTERIOLOGICAL RESULTS OF SAMPLES OF SWIMMING POOL WATER COLLECTED DURING WINTER AND SUMMER SEASONS

	All Months		*Summer Months June-July-August*		*Winter Months*	
Collection Bottle	*Per Cent 10 c.c. Tubes Positive*	*Per Cent Plates Over 200 per c.c.*	*Per Cent 10 c.c. Tubes Positive*	*Per Cent Plates Over 200 per c.c.*	*Per Cent 10 c.c. Tubes Positive*	*Per Cent Plates Over 200 per c.c.*
Treated	3.6	10.7	9.0	20.4	2.1	7.7
Untreated	2.0	7.6	4.1	11.9	1.2	6.4

TABLE II

THE INFLUENCE OF RESIDUAL CHLORINE ON THE BACTERIOLOGICAL RESULTS ON SAMPLES OF SWIMMING POOL WATER COLLECTED DURING WINTER AND SUMMER SEASONS

	All Months		*Summer Months June-July-August*		*Winter Months*	
Residual Chlorine	*Per Cent 10 c.c. Tubes Positive*	*Per Cent Plates Over 200 per c.c.*	*Per Cent 10 c.c. Tubes Positive*	*Per Cent Plates Over 200 per c.c.*	*Per Cent 10 c.c. Tubes Positive*	*Per Cent Plates Over 200 per c.c.*
Minimum or Over	1.7	4.3	5.3	11.6	0.2	1.4
Less than Minimum	9.5	29.9	15.8	42.4	3.4	18.1

treated bottles. Table I indicates the results of treated compared to untreated bottles, and the effect of seasons.

During 1934–1935, 4,362 samples were collected from swimming pools. Table II indicates the effect of residual chlorine content on bacteriological results, and also the effect of season. All of these samples were collected in bottles treated with sodium thiosulphate.

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Annual Science Exhibition

THE annual meeting of the American Association for the Advancement of Science and its Associated Societies will be held in Atlantic City, December 28, 1936, to January 1, 1937. This Association with an individual membership of 18,000 has associated or affiliated with it over 150 other scientific societies. Its annual meetings bring together representatives of all sciences.

The leading feature of the meeting in Atlantic City will be the Annual Science Exhibit which is expected to be the most successful in the history of the association. The leading American scientists have been generous with their time and money in building up the exhibition to its present distinction. It offers an objective means for enhancing the belief in the intelligence and integrity of manufacturers in the utilization of science. To the scientists in various fields, apparatus, equipment, and demonstration are more meaningful than formally presented papers. Thus the breach between the branches of science is lessened and the exhibition becomes an asset toward democracy.

Participation in this exhibit will be welcomed. Address communications to F. C. Brown, Director of Exhibits, American Association for the Advancement of Science, Smithsonian Institution Building, Washington, D. C.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

A GREAT MEDICAL LIBRARY

WE wonder how many of our readers, and especially members of our Association, know the history of the Army Medical Library, or, as it was called prior to 1922, the Library of the Surgeon General's Office, and are familiar with the treasures it contains. How many of us were aware that this year marks the 100th birthday of this Library, not only one of the foremost scientific institutions of the world, but the largest medical library in existence? We, the youngest of the great nations of the world, have in 100 years outstripped all others in the collection of medical literature. Indeed, we might say that this has been done practically within 75 years.

In 1836, Surgeon General Lovell had a small collection of books in his office, but it grew very slowly until Colonel John Shaw Billings came into the picture at the close of the Civil War in 1865. In this year the first printed catalog of the Library appeared, listing 2,253 volumes—602 titles under 11 topical subdivisions. At present the Library contains 941,181 volumes, showing the truth of the statement that most of the work has been done within 75 years.

Not only is it the largest library in the world, but it is one of the best. Only some 600 medical incunabula are known, and of these, the Library owns 450, many of them first editions, the greatest number in any library in the world, and a collection which bears comparison with that of any library anywhere. Of some works, the Library has the only known copy. Of rare books published after 1500, its collection is one of the best, and it possesses 150 early medical manuscripts of great value. The oldest publication it has is Johannes Gerson's *De pollutione nocturna*, printed in Cologne in 1467.

Of a number of rare books, the Library owns several successive editions. Some of these it is practically impossible to obtain now. Indeed, it is a marvel that starting the collection as late as 1865 these rare and valuable books were obtained

at all, especially as the appropriations for purchase have always been relatively small—not at all in comparison with the funds granted to the Library of Congress. The Army Medical Library has some 15 per cent as many volumes as the Library of Congress, but its annual appropriation for purchase is only about 9⅛ per cent as large.

The Library contains a more complete file of French theses than does the great library of the Faculty of Medicine of Paris. It has a great collection of authors' presentation copies, autographed.

This Library is open to the physicians of the United States, and it is safe to say that practically no medical work of importance is written without consulting its files, which serve also the medical officials of the Army, Navy, and Public Health Services. Certain publishing houses keep a number of employees constantly in the Library doing bibliographical research, abstracting and translating, and many textbooks have been written or revised almost entirely in the Library building, though this fact is seldom mentioned.

No one can have a fair idea of this Library unless he sees it intimately and works in it. Dr. William H. Welch once said that the four great contributions of America to medical science were: "1. The discovery of anaesthesia. 2. The discovery of insect transmission of disease. 3. The development of the modern public health laboratory, in all that the term implies. 4. The Army Medical Library and its *Index Catalogue*, and this library and its catalogues are the most important of the four."

Similar expressions have come from a number of well known men. Adami, of McGill University, in writing of the *Index Catalogue* and *Index Medicus*, said: "It is difficult to realize what service those two publications have been to science the world over, or what has been the influence also to medicine the world over, of the existence of the marvelously progressive Library of the Surgeon-General's Office, and its service in bibliographical search. . . . (It is) regarded everywhere as the model medical library. . . . I would go so far as to say that the outstanding service to medicine by the United States has been this Library with its publications."

Billings once said, "Books are properly compared to tools of which the index is the handle." He carried out this idea in furthering the *Index Catalogue* of 48 ponderous royal octavo volumes (compare with the Catalogue of 1865 with 2,253 volumes), and later the *Index Medicus*. These two publications have had almost as much praise as the Library itself. The late Sir William Osler said of the *Index Catalogue*, "Its preparation is Gargantuan," and it is recognized that in no other field of knowledge is there a work comparable to this, the world's standard of medical bibliography. In 1935, Bulloch[1] said, "Among catalogues the Surgeon General's is regarded by the authorities at the British Museum as the greatest ever achieved. It has the great virtue of being a subject index, unlike that of the British Museum, which is a name index only. The story of its construction is not as well known as it ought to be." When a change in the form of the *Catalogue* was discussed, the librarian of the Royal Society of Medicine of London said, "The possibility of being deprived of the *Catalogue* in its present form is horrible to contemplate," and Sir Humphrey Rolleston, at that time Regius Professor of Physic at Cambridge and President of the Royal College of Physicians, said, "The change would be a very serious loss to all those who read or look at the scientific side of Medicine, and would, for them, bring about a condition of affairs resembling that in the first half of the last century."

One would naturally say that this invaluable and irreplaceable collection must be housed in the finest of buildings, with every convenience for the use of its treasures, and absolutely fireproof. What are the facts? In 1885, $200,000 was appropriated for the building, and in 1887, the Army Medical Library and Museum was opened to the public. It is so cramped for space that when new books are added the old ones must be taken out and many are stored in the basement. Year after year efforts have been made to obtain a proper Library building. In 1919, a site was purchased in the Army Medical Center in Washington, but up to the present time the building has not materialized.

We wish we could give here a sketch of the librarians who have served this wonderful collection and those who have been responsible for the equally marvelous catalogues and indices. We cannot select one above another, but must mention Dr. Robert Fletcher, the Father of the *Index Medicus,* without whom this publication might possibly have never come into existence. In 1910 he was awarded the gold medal of the Royal College of Surgeons, which during a century has been conferred on but 11 others.

Perhaps the majority of the profession has not recognized that this was the centennial of this great Library, which is one of America's best known and most valuable possessions. We believe that Major Edgar Erskine Hume, the present Librarian, has performed a distinct service in giving an account of the Library,[2] his predecessors in the office, and especially the history of Dr. Billings, who, although he did not found the Library, is chiefly responsible for its being what it now is. We wish we could place this history in the hands of all our readers. We hope that this review, taken from the article by Major Hume, will stimulate the interest of those who have not yet made use of the Library. Something of what it is may be gathered from this brief review, but especially from an address given in 1881 by Dr. Billings. Even at that date he was able to say, "If the entire medical literature of the world, with the exception of that which is collected in the United States, were now to be destroyed, nearly all of it that is valuable could be produced without difficulty."

REFERENCES

1. *Brit. M. J.*, Oct. 26, 1935.
2. *Military Surgeon*, 78, 4 (Apr.), 1936.

NOTE: We have in this country other notable collections of medical books, some of them generally unknown. In 1920 there appeared *The Dawn of Modern Medicine*, by Albert H. Buck, M.D., a volume for which the William Chauncey Williams Memorial Publication Fund was responsible. In his preface he speaks of the difficulties he had encountered. Although he made a search in Europe, he failed to find the sources of trustworthy information which he thought necessary. He was disposed to abandon his writing of this book altogether when he received a letter from the librarian of Transylvania College, Lexington, Ky., telling him of a collection of medical works which had been purchased in Paris in 1819, concerning largely the years from 1760 to 1830. He moved to Lexington and lived there for 7 months, during which he wrote the book, taking his material almost entirely from this splendid and rare collection.

SCARLET FEVER

THE discussion of scarlet fever in its various forms continues. In the Borough of Chelmsford, England, in 1935, there occurred an extensive outbreak which is believed to have involved some 2,000 people, though only 360 cases were reported in the Borough, and some 120 in the adjacent district. The outbreak was explosive in character, most of the cases having occurred within 10 days. Almost all of them were traced to Dairy A, which handled milk from a number

of farms, which were found to be free from suspicion, with one exception. On this place there was one milker who had been working while suffering with a very bad sore throat from August 21 to 23 inclusive. It was during these days that the main infection of the milk supply was evident.

The particularly interesting feature of this outbreak was that the great majority of the cases, 1 in 5, did not show any rash. The milker to whom the outbreak was attributed also failed to show a rash. Extensive typing showed that the organism responsible for the outbreak was a hemolytic streptococcus type 2, which was isolated from the second sample of milk examined. It was found that the milker who suffered from the sore throat without rash also harbored the hemolytic streptococcus type 2.

During the time of the outbreak a cow with acute mastitis was found, but as it did not harbor the same type of streptococcus it was exonerated. Incidentally, it is now well established that the streptococcus causing acute mastitis in cows in the great majority of instances is not pathogenic to human beings.

The reporter who studied this outbreak believes that the term "scarlet fever" in a misnomer and points out that if attention had not been concentrated on rash as a diagnostic feature of scarlet fever, the outbreak would have been recognized much earlier and probably some of its worst features avoided. The absence of the rash was also responsible for the fact that so few of the large number affected were reported, though unquestionably all suffered from the same disease, as shown by bacteriological examination.

The outbreak demonstrates once more, what has been shown so often, that the rash, which has for so many years been considered typical of scarlet fever, cannot be depended upon for diagnosis.

POLIOMYELITIS

POLIOMYELITIS continues to give much concern to the health officers of the country. Since the big epidemic in Los Angeles in 1934, it has advanced east and up the Atlantic seaboard. Accounts of the epidemic in Los Angeles attracted much attention at our Annual Meeting in Pasadena in 1934. At our Annual Meeting in Milwaukee in 1935, there was much discussion of the vaccines proposed to control the disease; and before the Southern Branch of our Association in St. Louis, the same year, there was presented a most valuable symposium on the disease in North Carolina, Virginia, Kentucky, and Tennessee, as well as reports on the use of the vaccines of Brodie and Park, and Kolmer. During the year 1935, considerably more than 10,000 cases were reported in this country, the incidence varying from 258 per 100,000 in Rhode Island, to 1 in Idaho, and 2 in Georgia, Oklahoma, and Wyoming. The year 1936 has been marked by quite extensive outbreaks in several of our southern states, Alabama leading in the number of cases.

The menace has been such as to lead the Essex County Health Officers Association of New Jersey to form a poliomyelitis committee, which has sent a questionnaire to a group of cities throughout the United States. Twenty-six answers were received from the health officers of the largest cities. As might have been expected, the answers varied widely. Some health officers said frankly that so little was known about the disease that they were reluctant to commit themselves. The replies have hardly furnished a basis for constructive regula-

tions, but are useful in indicating the differences of opinion among those officials charged with preventing and controlling epidemic diseases.

As to the methods of spread in poliomyelitis, there was practical unanimity that the path of infection was through the upper nasal and pharyngeal surfaces, and that the virus reached the individual by contact, usually through sneezing, coughing, kissing, and droplet infection. A small minority were inclined to look with suspicion upon dishes, some foods, and articles of general use.

In discussing the autumnal prevalence of the disease, there was difference of opinion, some health officers pointing out that in their sections the autumn was not the season of greatest prevalence. It may be noted here that, in Alabama particularly, the disease has been prevalent in June and July of this year, and this was true for North Carolina and Virginia in 1935. However, the opinion was general that the collection of adults and children at resorts during summer vacations furnished the environments in which contagion was most favored, and that the outbreaks were likely to occur when these people returned to their homes and schools. It does not appear that the facts fit the theories entirely.

Several health officers laid stress on individual susceptibility, and increased susceptibility brought about by fatigue, diet, constitutional factors, climatic conditions, cellular immunity, etc., while one health officer, who has had a large experience, considered dosage of the virus of importance, holding that a transitory exposure was not dangerous, and that "continued exposure was almost always necessary to cause infection."

The health officers were far from being at one concerning regulatory requirements. A decided majority opinion opposed the closing of schools except for the grades for children under 7 years of age. Postponement of the opening of schools in the presence of an epidemic was widely favored. There was considerable division as to the legal closing of movies, theatres, fairs, swimming pools, etc.

The hospitalization of all cases was generally favored, not only on account of giving the patient a better chance for recovery, but also for avoiding alarm.

The general use of throat and nose sprays containing materials which have been suggested, such as sodium alum, tannic acid, and picric acid, was not generally approved of, though some officers advocated studies under proper control.

The Essex County committee drew up a set of regulations embodying what they believe to be the best practice in view of experience and present knowledge. Hospitalization of all cases is advised. Immediate report by physicians to the local health department of all cases of paralysis, as well as those showing fever, headache, vomiting, and stiffness of the neck is urged. Services of a diagnostician should be available when possible. The opening of schools should be postponed during an epidemic. Playgrounds should be closed or else used for separate classes during recess periods, with no mixing of grades. Swimming pools should be kept open but regularly chlorinated during epidemics. Contacts under 16 should be put under observation for at least 14 days. The public should be advised against allowing children under 12 years of age to attend circuses, fairs, picnics, and movies.

While this questionnaire and the replies received show our lack of exact knowledge in regard to a number of essential facts, it is useful in calling attention to the divergence of opinion and practices now in effect. New Jersey will doubtless benefit by having more uniform methods of observation and control.

PUBLIC HEALTH EDUCATION*

National, state, and local agencies . . . public and private . . . commercial groups . . . publishers . . . all who issue health education material . . . are invited to read *Your Part at New Orleans.*

Your Part at New Orleans—The part of national, state, and local health agencies, commercial groups, publishers, and all others doing health education, or supplying health education materials is vital to the full success of Health Education Headquarters at New Orleans.

According to present plans there will be displayed a generous array of helps in the technical side of health education, both in the schools and in the communities.

Then there will be shown various classified collections of printed and other materials used or made available for use by health agencies.

Your part is to make possible extensive additions to the collection of classified materials.

National and state agencies, commercial agencies, etc., *which issue material for others to use* are invited to make up specimen sets, with prices and other detailed information, prepared in portfolio form. *All such portfolios should be forwarded, prepaid, direct to New Orleans.* Please write to the chairman for information as to when and where to ship or to deliver packages.

Those who have exhibits, posters, lantern slides, etc., for sale or loan, should send them direct to New Orleans, *but should write for information as to when and where.*

Graphic displays from all sources will be welcome *if advance information is requested as to when and where to ship or to deliver.*

In addition to the above, local and general agencies are requested to send specimen copies of health education materials (clipped, printed, mimeographed, or otherwise duplicated) *to the chairman in New York.* Such specimens will be assembled in classified portfolios: newspaper articles, photographs, radio talks, bulletins or house organs, exhibits, plays, announcements or catalogues, etc., etc. Please send the above as early as possible.

For information as to when and where to ship please write to the chairman, Evart G. Routzahn, 130 East 22d St., New York, N. Y. Send to the same address the specimens of materials for the classified portfolios.

Individual and Group Conferences at New Orleans—According to present plans, special attention will be given at Health Education Headquarters to conferences with individuals and groups interested in any phase of health education.

Please list your problems and your questions and submit them early in the week.

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

Likewise kindly come prepared to report on your experiences, your successes, and your failures, if any.

Free Distribution at New Orleans—Space will be provided for free distribution of copies of health education materials, and lists or catalogues of helps and materials issued by non-commercial agencies.

Please write to the chairman in advance for instructions as to shipment or delivery.

Sorry! Our Mistake!—Dr. A. S. Baker, Health Education Adviser, Seattle, reminds us that he is with the *State* Department of Health, not the City Health Department, as stated on pages 737 and 739, July, 1936. Why anyone should have misread the letterhead is inexplicable. Just one of those things!

So Many Had Something to Contribute—That so many health workers have had illustrative experiences is the most striking feature of the symposium on venereal disease publicity.

When we began publication of these reports there seemed to be a widespread belief that both press and radio were closed channels to any wording more frank than "social diseases." Yet the reports as published show fairly general willingness to avoid hypocrisy. But so few health workers had reported the progressive steps taken that such action by a newspaper or station was accepted as being exceptional.

So many have something to contribute on numerous health situations. Widespread alertness among public health workers in reporting what they do and what others do would further the progress of public health activities. Here we have given space to the venereal disease reports partly to illustrate and emphasize the helpfulness of experience shared with other health workers.

As to venereal disease, *Editor and Publisher*, chief journal of the newspaper world, is sympathetic. Give them something to write about by sending marked copies of your local newspapers. Address: Times Building, New York, N. Y.

Why Not Try for Radio "Spots"?—Business seems to be making much of the "spot" or "station-break" announcement, the 30 to 60 second interval between network programs. Some health agencies, and more of varied social agencies, have already discovered the possibilities of these bits of radio time, or possibly, chinks in radio time. The watch company has long illustrated one use of this time. Some of the chest campaigns have made good use of a station announcer for "spot" statements.

The bigger audiences are "on the line," the copy is not so difficult to write, an idea may be pushed a number of times in the course of a few days. But of course alert advertisers are likely to buy the best of the periods.

If you want more on the subject see "Breaks for the Radio Advertiser" in *Advertising and Selling*, 9 East 38th St., New York, N. Y. July 16, 1936. *15 cents.*

Art in Health Teaching—The April-May, 1936, issue of *Baltimore Health News* (Health Department of Baltimore, Md.) was a smallpox issue. Articles and editorials included one on "The Reactions Which Follow Smallpox Vaccination." This was illustrated by a 3 page offset lithographic color plate to

> . . . represent a careful selection of the standard types of reactions which follow smallpox vaccination. They were painted from life by Leon Schlossberg, pupil of Max Brödel, in the Department of Art as Applied to Medicine, in the Johns Hopkins Medical School.

This material has been sent to deans of medical schools in the United States, Canada, and England. Copies of this issue of *Health News* are supplied at *25 cents,* a charge made necessary by the cost of the color plate.

Health Education in a City Health Department—We have all too little in print on what a health department should or could actually do in health education and how to go about it. A 5 page contribution on this subject is "The Educational Work of a Health Department," by Savel Zimand, who says:

While health problems vary with the locality and therefore the educational program must inevitably differ with the community and the individual districts in that community, there are certain basic essentials which will be found in the health department educational program of almost any locality. A comprehensive health department program of education would cover at least two phases: (1) popular health education; and (2) health education for professional groups. Fundamental though school health education is, it is not included here, since in the majority of localities including New York City, this phase is usually regarded as the function of the school authorities, although the official and voluntary health agencies can be of assistance in various ways.

One important function of popular health education is to give the community a general knowledge and understanding of the work of the official health organization. Few people now realize in full the important rôle played by a health department in maintaining the welfare of a city, or the various services it renders which have a direct influence on their own and their family's life. The public should know how a health department functions; its responsibilities; the services it maintains; when and how they may call upon it for help; what constitutes a violation of health ordinances; and to whom such violations should be reported. . . .

Aside from familiarizing the public with the work of the health department, the objectives of a well rounded program of popular education might be summarized as follows: (1) educating the public concerning health conservation, disease communication, and methods of safeguarding health; (2) securing desirable changes in public opinion; and (3) educating the community to utilize the services of a private physician, or if financially unable to pay for such services, to use those of the community's clinics or hospitals.

Mr. Zimand discusses the selection of subjects, and the possibilities in "personal instruction," and "mass education."

Whatever the methods or the subject matter there are

. . . certain fundamental conditions without which they cannot accomplish their purpose. These are *scientific accuracy, emotional appeal, concreteness and simplicity.* In addition, the program must be adapted to a specific audience and presented at an opportune or psychological time. Certain problems are city-wide and others are more local in character.

Written by a big city man yet the ideas pretty generally may have a wide application. In *Public Health Nursing,* 50 W. 50th St., New York, N. Y. July, 1936. *35 cents.* For a reprint write to the author, Department of Health, 125 Worth St., New York, N. Y.

"Warranted Publicity"—Headed by these words the Elizabethton, Tenn., *Star* (July 16, 1936) editorialized as follows:

A neighboring newspaper, which might represent the policy of the majority of newspapers of the nation, falls over backward in a recent editorial in an attempt to avoid using the word "syphilis," despite the fact that the editorial meant absolutely nothing with the word omitted and only conveyed the meaning that the writer of the article knew something which the reader should know but he just couldn't dare to tell it.

The writer winds-up his meaningless hodgepodge of words by stating that "public sentiment may soon demand frank discussion of this subject in the newspapers and public forums." Where has the writer been? Does he know that all New York papers have adopted the policy of writing about the symptoms, causes, and ravages of syphilis and other venereal diseases as they would scarlet fever—only with more emphasis in an attempt to overcome the "ttch, ttch" attitude which has been shown in the past whenever it is mentioned? Does he read the current periodicals which are more and more coming

to realize the dangers that lurk in a secretive attitude toward the diseases and are working to combat the general lack of knowledge about them?

The "shush-shush" attitude is discussed in two paragraphs. Then the editor emphasizes that the *Star*

. . . has made it a practice for some time to carry information concerning this disease. In this issue is one of a series of articles on venereal disease, published through the Carter County Health Department and Carter County Medical Association.

The *Star* did not adopt this policy to create any sensationalism, the manner in which the articles were carried could not possibly warrant this accusation. . . .

Surely the accusation could not be made that a newspaper, the most widely read medium of information in existence, is not the proper thing in which to carry such articles while trial testimony from love balm suits, giving complete details of an intemperate bedroom scene, is run under big heads and played on the front pages of the papers. . . .

Accompanying the clipping Dr. *Franklin M. Foote, Carter County* Health Department, says:

So that you will know that we hill billies have a wide awake press, I am enclosing an editorial from the *Star*. As you can see, this followed a brief editorial in a Johnson City paper mentioning a dread disease the health department was treating there, without even mentioning the euphemism "social disease." The accompanying editorial was written without the knowledge of anyone connected with health work purely on the local editor's initiative. Incidentally, I may add that this paper prints all our releases on syphilis and gonorrhea as readily as those on typhoid fever or poliomyelitis or whatnot. This is the third editorial that has appeared within 6 months in this paper concerning the diseases in question. When I presented a baby with gonorrheal ophthalmitis before the county court, the local appropriating body, the story was carried on the front page with "Venereal Disease" in the head.

NEW

The Child—Monthly News Summary, U. S. Children's Bureau, Washington, D. C. A 28 page planographed monthly news summary: the social security program for children; maternal, infant, and child health; child labor; socially handicapped children; international and foreign notes. A helpful device is the sub-title, "Book and Periodical Notes," under most of the main headings. *Free.*

Health Education in July, 1936, Journal—Having more or less to do with health education are the references noted below.

The quotation about Charles Kingsley (page 671) may be usable on occasion.

"Effect of Relief Programs on Public Health Nursing in the State, by MacDougall (pages 672–676), discusses *preparation of the nurses*, and certain community relationships.

"The Sanitary Code" (page 676): early history of English public health organization.

A plea for accurate use of the word "cure" (page 724).

Especially interesting and significant is the announcement, "Office of Public Health Education Established" (page 732), in the U. S. Public Health Service.

See "The Art of Leadership" (page 743) in "Books and Reports."

Hygeia, August, 1936—Titles and topics for various uses are suggested by the contents of *Hygeia*, 535 N. Dearborn St., Chicago, Ill. A copy *free* to teacher or health worker.

The other side of motor casualties (not due to the driver). . . . The care of infantile paralysis. . . . The "compatible eating" fad. . . . Health and the circus (the hospital car and medical services). . . . Home canning for the diabetic. . . . Safety in industry. . . . The Martin family vacation; eagle scout; little sister; garbage; camp fires; let's eat, but where? . . . Ignaz Philip Semmelwers (Hungarian). . . . Impending mosquito massacres (wholesale methods). . . . Mental attitudes vs. health. . . . And the deaf shall speak (lip reading). . . . Evolution of the microscope (picture page). . . . Germs and their enemies.

. . . The germs we live with (staphylococci). . . . "Athlete's foot" in pools and on beaches. . . . Marcus Whitman: pioneer physician. . . . New books on health. . . . Questions and answers.

In "School and Health":

Am I helping my pupils to overcome their fears? . . . Teachers for convalescent children. . . . The play life of the teacher. . . . Living health in an open window room.

MAGAZINE ARTICLES

"Four Highway Perils: Speed, Liquor, Sleep, and Morons." This title of an editorial points the way to safety. *Christian Century*, Chicago, Ill. March 25, 1936.

"How Do You Stand?" by B. M. Rowe. *Farmer's Wife*, St. Paul, Minn. April, 1936. A posture article.

"It's the Little Things That Count," by L. Clendening. *Saturday Evening Post*. March 7, 1936. Colds, bad breath, acne, athlete's foot, etc., etc.

"The Case of John A. Kingsbury," by James Rorty. "First of a series on medical politics." *Nation*, 20 Vesey St., New York, N. Y. June 24, 1936. "The Attack on Group Medicine" (including what the A.M.A. "knew about the Borden boycott"). July 4, 1936. "Whose Medicine?" (the layman's concern in the A.M.A.; the profitable Journal of the A.M.A.; the prescribing of "ethical" proprietaries; excellent work of Council on Pharmacy and Chemistry. July 11, 1936. *15 cents* each issue.

"Reducing for Epicures," by L. Clendening. *Saturday Evening Post.* July 18, 1936.

"Safety-Conscious Britain," by H. Callender (what is being done); "White Sticks Save Lives" (how white walking sticks protect the blind); magazine references on safe driving. *Rotarian*, 35 East Wacker Drive, Chicago, Ill. Aug., 1936. *15 cents.*

"West Virginia's 'Black Hole of Calcutta.'" *Social Service Review*, University of Chicago Press, Ellis Ave., Chicago, Ill. May, 1936. *$1.25.* Emphasis on responsibility of West Virginia and of tunnel company for deaths by silicosis.

RADIO

A "Station List" is supplied free by Radio Institute of the Audible Arts, 420 Lexington Ave., New York, N. Y. Lists stations of major networks, giving city, network, and frequency. Will aid in locating health talks given outside your city.

An Early Diagnosis Campaign broadcasting program in April was conducted by New York Tuberculosis and Health Assn. in coöperation with National Tuberculosis Assn. and New York Academy of Medicine. There were 30 talks over 11 stations with 8 talks on networks of Columbia, National, Mutual or Knickerbocker systems.

American Medical Assn. (N.B.C. Red network and Pacific network):

Little tips on home hygiene . . . Heart disease . . . Crippled children . . . Cancer . . . Hard of hearing . . . Eyesight saving . . . Hay fever and asthma . . . Let your doctor decide . . . Middle age . . . Summer camps.

Baltimore Health Dept. and Medical and Chirurgical Faculty of Maryland:

Care of baby during the winter . . . Meningitis on the increase . . . Another public health enemy: lobar pneumonia . . . Baby's bath . . . Banish ancient food fallacies . . . Rats: our million dollar luxury . . . This is Negro health week . . . Summertime and typhoid fever.

Connecticut State Dept. of Health (WTIC):

Standards for clean milk . . . The child is father to the man (mental hygiene) . . . In the wake of the venereal diseases . . . Dying 200 different ways . . . Modernization of water supplies . . . Public health nurse a good investment . . . How about breakfast? . . . Your cook: friend or foe . . . Cost of venereal disease . . . Value of records . . . Public and private nuisances.

Illinois State Dept. of Public Health (WHFC or WGN):

Is this the most interesting subject to Americans? (stomach) . . . Public enemies (syphilis) . . . Can we be cancer wise and cancer sensible? . . . Speaking of kidney disease . . . The great American deterrent (failure of prisons) . . . Morons, medicine, and mental hygiene . . . The new commanding general and the health army (Dr. Parran) . . . Public health and public enemies . . . Control of crime . . . Pure cosmetics and the skin game . . . Food, mothers, and the law.

Jefferson County Board of Health (Birmingham, Ala.) (WAPI):

School children and communicable diseases . . . "That bad cold" . . . The process of growing old . . . The greatest world war of all time (germs) . . . Influenza . . . Good manners and the public health.

Minnesota State Medical Assn. (WCCO):

Hay fever . . . Rheumatic fever . . . Narcolepsy . . . Sore mouth.

New York City Dept. of Health:

Posture and people . . . In the headlines (cancer) . . . Health on review . . . Your child a movie actor? (improving the child's face) . . . Anemia . . . "I can't understand what's come over her" (an interview) . . . Your city's health . . . Milk and the seven ages of man . . . They bring health to the people (public health nurses) . . . Emancipation from disease . . . High blood pressure . . . Sense, safety, and reducing (a series) . . . Common sense and mental hygiene . . . The ads in heaven.

Ohio State Dept. of Health (WOSU):

Tuberculosis sanatorium education . . . Trichinosis . . . Crippled child . . . Explanation of the tuberculin test . . . The winter's carbon-monoxide record . . . Importance of dental care . . . Seasonal hazards of typhoid fever . . . Stream polution abatement . . . Summer problems in milk sanitation.

IT HAS BEEN DONE

A fact made graphic:

The National Organization for Public Health Nursing staff, in visiting 44 states, has traveled 4.7 times around the world.

The 6th annual health poster contest for high school art students in New York has just ended. The contest is distinctive in (1) the coöperation of education and health authorities; (2) the active participation of the outdoor advertising industry; (3) the nature of the awards; (4) and the actual billboard production of the prize winning poster, usually. For the contest folder write to Committee on Tuberculosis and Public Health, S.C.A.A., 105 E. 22d St., New York, N. Y.

FOR USE OR REFERENCE

For background, to pass on to selected people, to reproduce, to adapt—here are a variety of items to select from.

Many publications formerly issued by the American Child Health Assn. are now supplied by either the American Public Health Assn., 50 W. 50th St., New York, N. Y., or National Education Assn., 1201 16th St., N.W., Washington, D. C.

A series of mimeographed pamphlets has been prepared by New York Diabetes Assn., a subsidiary of New York Tuberculosis and Health Assn., 386 4th Ave., New York, N. Y. Each is mimeographed on letter size sheets, with a stiff, colored cover. The cover page is lettered with the stencil device provided for use with the mimeograph. With a back cover sheet, and three staples on the left, the series is given physical weight and permanence for continued office use. The titles:

Survey of Diabetes Clinics in New York City

Diabetics Under Treatment in New York City

Incidence of Diabetes in Certain Educational and Industrial Groups

Directory of Diabetes or Metabolism Clinics in New York City

The New York Diabetes Association

If you have any building or institution with a bit of planting space for

trees or shrubs see " Getting Material to Beautify the Plant," by C. K. Calvert. *Municipal Sanitation*, 24 W. 40th St., New York, N. Y. April, 1936. *15 cents*. An appeal for planting; what to plant, and how.

" Advancing the Health and Welfare of the Nation's Children Through Federal and State Coöperation," by K. F. Lenroot. Reprint. U. S. Children's Bureau, Washington, D. C.

" Delinquent Patients in Venereal Disease Clinics," by Reinhard and Fales. Reprint. Health Dept., Baltimore, Md.

" Foods and Cooking," etc. List of government publications for sale. Supt. of Documents, Washington, D. C. *Free*.

" General Anesthesia: Historical High Lights," by J. T. Gwathmey. Reprint. American Medical Assn., 535 N. Dearborn St., Chicago, Ill. *5 cents*.

" A Manual of Information for Physicians on the Treatment of Syphilis and the Control of Venereal Disease," by Stokes, Parran, and others. Reprint. American Medical Assn., 535 N. Dearborn St., Chicago, Ill. 48 pages. *10 cents*.

" Medicine and Men," by F. E. Sondern, M.D. 8 page reprint on medical economics. Public Relations Bureau, Medical Society of State of New York, 2 E. 103 St., New York, N. Y. *Free*.

" The Menace of Trench Mouth," by J. A. Tobey. Reprint from *Good Housekeeping*. *Free* from the author, 350 Madison Ave., New York, N. Y.

" The Pasteurs, Kochs and Listers of Today " is a series of brief biographies with drawings of " living health heroes ": Dr. Mary Rose, Dr. Sherman, Dr. Crile, Dr. Park, and others. Health News Service, 22 E. 40th St., New York, N. Y. Prepared for newspaper publications, the material should be useful in health agency house organs, employees' house organs, foreign language papers (which include some English), etc. Mats are available for the articles, and for the headings and drawings.

" Pneumonia." Definition; method of spread; prevention; care of a patient; serum treatment. 4 page folded; uncrowded pages. New York State Dept. of Health, Albany.

" The Problem of Fireworks Accidents." Various authors. National Society for Prevention of Blindness, 50 W. 50th St., New York, N. Y. 30 pp. *15 cents*. Accompanied by chart reporting details of accidents, state by state.

" Protecting the Dionnes " is a 24 page advertising pamphlet, with some 24 pictures of the famous babies, with text. Lehn and Fink Products Corporation, Bloomfield, N. J.

" Public Health Service Publications." List of issues July–Dec., 1935. *Public Health Reports*, Supt. of Documents, Washington, D. C. April 17, 1936. *5 cents*. Most of the technical pamphlets listed are supplied *free*.

" Silicosis: An Interpretive Review of Accumulated Experience," by Dr. C. O. Sappington. Revised in 1934 it is again timely. Address the author, 330 S. Wells St., Chicago, Ill.

" Sissy," by Florence M. Bauer. A play. Reprint from *Hygeia*. American Medical Assn., 535 N. Dearbrn St., Chicago, Ill. *10 cents*.

" Wage Your Fly War Coöperatively," by R. W. Harvey. *Eastern States Cooperator*, 95 Elm St., West Springfield, Mass. June, 1936. *Free*. Information to pass on, especially in rural work.

" What Every Teacher Should Know About the Physical Condition of Her Pupils " (30 pp.); " Training of Elementary Teachers for School Health Work " (27 pp.). Both by J. F. Rogers, U. S. Office of Education. Supt. of Documents, Washington, D. C. Each *5 cents*.

BOOKS AND REPORTS

Public Health Nursing—*By Mary Sewall Gardner, R.N. (3d ed.) New York: Macmillan,* 1936. 476 pp. Price, $3.00.

Miss Gardner's book, *Public Health Nursing,* has ever since its first edition in 1916 been the only text of its kind in the field. This new edition, the third, lives up to the high standards set by its predecessors and will prove of value to all who are interested in the public health nursing movement. No nurse can read the first few chapters, which deal with the historical development of public health nursing in this country and abroad, without being thrilled at the picture she draws of similarity of purpose and principle, and of wide variation of method due to local conditions. Practice in this country is then discussed in detail, emphasizing always the underlying principles, and considering those problems which arise in relation to the nurse herself—her selection and preparation, her relations to families, other health and social workers, and to the supporting public. What does public health nursing have to offer? What does it demand of the staff nurse, the supervisor, the administrator? Here Miss Gardner's years of professional experience and her personal wisdom stand her in good stead, and she writes with an understanding and insight that make these chapters well worth the reading.

The latter part of the book is devoted to the larger problems of organization and administration, support under private and public auspices, the value of lay boards, and use of volunteers. Those special services in which the public health nurse plays an important part are discussed in some detail—the maternity and child health program, school and industrial nursing, the control of communicable diseases, mental hygiene, and the contribution of the public health nurse to this movement.

With the rapid expansion of public health nursing today, especially in the rural areas, there is need on the part of all for clear thinking and an appreciation of basic principles if growth is to be sound. Miss Gardner's book makes us mindful of the fine achievements of the past, and points the way to sound developments for the future. It is worthy of careful study by all who would practise the "art" of public health nursing.

KATHARINE FAVILLE

Vitality: A Book on Health for Women and Children—*By Elizabeth Sloan Chesser, M.D. New York: Oxford University Press,* 1935. 254 pp. Price, $2.50.

A good many medical authors in writing books for the general public seem to have considerable difficulty in working out a consistent plan. Usually the error committed is one of including too much medical detail. This is true of the book under review. Much of Section 2 comprising the last 145 pages and dealing with sick nursing in the home could have been omitted with advantage. After all, it is the attending physician who is responsible for the care of the ill and it does not help much to have someone else tell the nurse, whether through the pages of a book or otherwise, that the family physician will probably do this or will probably order that. On the other hand this book fails to grasp a real opportunity to emphasize again and

again the importance of such preventive measures as immunization.

The first section of the book dealing with ways of keeping healthy is better. Even here, though, the statements are often exaggerated or inaccurate; as, for example, "When we are healthy and fit we do not succumb to the microbes of disease, even when we breathe or swallow them." The chapters on Health and Education; The Healthy Child; and Youth and Health are pretty good, although a touch of Polyanna spoils some of the advice on mental hygiene. After all, seeing and facing things as they are without self-hypnosis is not so bad a rule to follow whereas "Thinking the Right Thoughts"—with capital letters, of course—may not infrequently degenerate into piffle.

On the whole, the reviewer thinks that there are more useful books than this available to the public.

MERRILL E. CHAMPION

Hospital Accounting and Statistics: A Manual for American Hospitals—*By Michael M. Davis et al. Chicago, Ill.: American Hospital Association,* 1935. 85 pp. Price, $1.00.

Accurate and relatively complete data regarding the costs of medical care are, perhaps, more urgently needed by those truly interested in the broader aspects of medical service than any other single type of data. And, although estimates of the cost of hospital care are probably more reliable than estimates of other varieties of medical service, there is still opportunity for tremendous improvement. Especially is it true that there is much to be desired in the unification of hospital statistical reports.

The present book contains an outline of standard procedures for the handling of hospital expense and income accounts. The primary aim of the book is to present methods of classification that can be used by hospitals throughout the country. Clear-cut definitions and sufficient details are given to permit the adoption of the plan in all hospitals whether large or small, public or private. The next step, which is undoubtedly more difficult, involves the development of a plan for insuring its general adoption. The American Hospital Association and its Council on Community Relations and Administrative Practice are to be congratulated for the completion of the initial step in this pioneer work.

CARROLL E. PALMER

Swimming Pool Data & Reference Annual—Volume IV—*Earl K. Collins, Editor. New York: Hoffman, Harris, Inc.,* 1936. Price, $2.00.

The 1936 *Swimming Pool Data and Reference Annual,* which is the fourth volume of this book, brings together in a comprehensive reference manual selected articles written by some outstanding authorities in the swimming pool field. The book is instructive and well worth reading by all interested in swimming pools in any way, but is of special interest to architects and engineers; to contractors; to swimming pool owners and operators; to swimming instructors; and to public health officials.

The 1935 Report in full by the Joint Bathing Place Committee of the State Sanitary Engineers and the American Public Health Association is included. This report should be in the library of all public health officials interested in the supervision of swimming pools. A very timely article on wading pools by Dr. W. J. McCormick stresses the point that if a wading pool is deep enough to allow swimming by the children it should be designed as a swimming pool, but that if a pool is to be used as a wading pool, and is so designed, the use of the pool should be rigidly restricted to wading only. The tendency in some cities is to build swimming pools for

children, but call them wading pools. Dr. McCormick also shows that there is practically no supervision of wading pools throughout the United States.

The answers to an interesting questionnaire have been compiled by Editor Earl K. Collins on charges, fees, practices of swimming pools on a national basis, after a nation-wide survey of swimming pools.

There is a special worth while article to the public health officials and to the operators of swimming pools written by C. A. Holmquist and Charles R. Cox of the New York State Health Department on the "Guidance in the Design and Operation of Municipal Pools." This article should be read by all those responsible for the development of park systems in municipalities.

Special types of the most modern pools are described. The construction of water-tight pools is also outlined in a separate article. Among the helpful practical discussions is one on the swimming pool operators' problems which outlines the results of a nation-wide survey. E. S. Bishop discusses water temperature control for shallow baths and pools. A mechanical engineer compares the cost of purchased versus privately pumped water and also the piping hook-up for utilizing steam in a pool. The manager of a hotel pool outlines some important points in the cleaning of pools with the suction cleaners. A representative of the tile manufacturers association discusses tile and tile work for swimming pools.

A large number of commercial companies advertise equipment and supplies for swimming pools covering pretty well the entire field.

Anyone interested in swimming pools, whether designing, constructing, or operating a pool, supervising the operation of swimming pools from the public health viewpoint, or interested in swimming and in physical education progress, will find it well worth while to have a copy of this reference in his library. ALFRED H. FLETCHER

Sports for Recreation and How to Play Them—*The Staff of the Intramural Sports Department, University of Michigan, Elmer D. Mitchell, Editor. New York: Barnes,* 1936. 467 pp. Price, $2.50.

This text covers 28 sports, ranging from archery and horseshoe pitching to ice hockey and touch football, including such typical sports as boxing and wrestling, swimming, rowing, fencing, and soccer.

Designed "to extend and develop the increasing interest in healthful recreations, to assemble in convenient form needed information on the various forms of physical recreation . . . and to treat each sport from the standpoint of the beginner or average player . . ." it meets a real need.

Considerably more than half the content is devoted to individualistic competitions, such as tennis, golf, swimming, fencing, winter sports, and the like, which have a distinct value as recreation in years after college, when playing team games is less attractive and not safe. This is in accord with the modern trend in physical education which aims at training for a lifetime, rather than for the exhibitionism of football, basketball, and other team games. CHARLES H. KEENE

Current Problems in Camp Leadership—*Edited by J. R. Sharman, Marjorie Hillas, and D. K. Brace. Ann Arbor: Ann Arbor Press,* 1934. 120 pp. Price, $1.25.

This workbook for camp counselors and directors is the product of an editorial board, the members of which are engaged in physical education, camp work, or recreation activities in various parts of the country. Stimulation of the camping movement created a demand for leaders in camps. At the

time of printing, over thirty institutions were conducting courses for the professional preparation of camp counselors and directors. The volume was designed to meet the need for organized materials suitable for use in such college courses, coupled with a need for materials for use in the pre-camp training periods conducted by camps for the preparation of counselors. The preface states: "The ideal camp director or counselor should be a person of superior personality with a broad education and several years of successful experience in camping."

The contents are divided into 34 units, each prepared by contributors especially selected because of experience in the field discussed. These units deal with: duties of personnel, camp organization, camp objectives and government, health education, personal health problems, mental hygiene, first aid, education, sports and other activities, art, handicraft, music, sanitation, methods of appraising results and of measuring the effects of camp life. Each unit consists of introductory paragraphs leading up to a series of exercises and problems for the student, followed by useful references.

To quote from the unit on health education:

> Living in the out-of-doors under proper conditions is generally considered healthful, yet boys and girls have returned from camp tired, restless, and weighing less than when they went to camp. In recent studies, it has been attempted to determine the extent to which camp life contributes to healthful development of the campers. Implications from these studies are that the camp contributes to healthful development only in the proportion to which it is organized and administered according to progressive health practices. An effective and efficient health program should include (1) health supervisory activities, (2) health service activities, and (3) health instruction activities.

And later under personal health problems:

> Although the health of the camper is the chief concern of the camp physician, the nurse, and the dietitian, nevertheless the general staff, including the director and all counselors, has no small part to play in the health program.

In the next edition, the importance of additional public health safeguards, such as pasteurized milk, might be stressed, but in general this book represents a useful contribution of much value to those concerned with the camping problem, including public health officials. IRA V. HISCOCK

California Medical Association Cancer Commission Committee Studies—*San Francisco: J. W. Stacey, Inc.*, 1936. Paper, 129 pp.

One of the greatest obstacles to the cure of cancer is the fact that its early diagnosis and proper treatment lie often beyond the ability of the physicians who first see the cases. Another is the fact that suspicious cases are not more often referred, during the period when they are curable, to physicians who have the knowledge and skill to handle them in accordance with advanced practice. Cancer is a condition which generally calls for very special attention, and the average practitioner of medicine or surgery is not necessarily possessed of the training and experience in this particular direction to qualify as an expert.

The publication under review is an attempt to reduce the gap between the best knowledge and the common knowledge of cancer in its various forms and locations. It is chiefly the work of a permanent committee, or so-called Cancer Commission, appointed by the California Medical Association in 1931, and of a number of committees appointed by that commission. During the last 5 years a series of articles by these committees have been published by the Cancer Commission in *California and Western Medicine*, and these have now been brought together and published in the little volume before us. The

publication is for medical men entirely.

There are sections on tumors in various parts of the body and one on the subject of radiology. Each section is signed by a dozen or more physicians who are immediately responsible for it; the one on radiology has thirty-eight individual sponsors. This gives to the pronouncements an appearance of authority and disarms any criticism that anybody is advertising—two considerations to which physicians who do considerable work with cancer patients feel compelled to give much attention.

The book is compact, and well divided and sub-divided for rapid reference, but its very small type and poor paper, together with its paper cover and pocket size, make it less comfortable to read and less likely to be found when wanted than could be desired. Its newness gives it a special value. Thought and practice have been advancing considerably in the diagnosis and treatment of cancer and every physician and surgeon should strive to keep abreast of this progress, at least in his reading. GEORGE A. SOPER

A Survey of Public Health Activities in Honolulu, Hawaii—Including Official and Voluntary Agencies—*By Ira V. Hiscock, C.P.H. Chamber of Commerce of Honolulu,* 1936. 149 pp.

This book should be read by all engaged in public health administration if for no other reason than to give them a cause to ponder over the shortcomings of health work in the continental United States. The tremendous possibilities for good in the loyal and intelligent support of official health administration by civic organizations is evidenced from beginning to end in this report.

Public health administration in the Island territory was surveyed in 1928, and the far reaching recommendations of that report were carried out to a surprising degree during the years intervening between it and the survey reported upon (conducted, be it noted, by this Chamber of Commerce). Though known as "the paradise of the Pacific," the Islands suffer the imperfections of this mundane sphere, so further improvements in public health administration naturally were discovered.

The recommendations are so eminently practical, and the need for betterment in public health administration so pressing that one feels sure that a subsequent survey will find them as nearly completely met as were those of the first. That the Island territory will have an administrative organization of unusual efficiency is safe to prophesy when one considers the agencies and people behind the movement. The author says in his introduction: "To have the opportunity to return to Honolulu was a special pleasure." A reading of the report leaves no doubt of the sincerity of that comment.

RAYMOND S. PATTERSON

Manson's Tropical Diseases—*Edited by Philip H. Manson-Bahr (10th ed.) Baltimore: Wood,* 1936. 1003 pp. Price, $11.00.

This treatise, which has been for so long a standard, has now reached its 10th edition. The most notable change in the new edition is the expansion of the text on the clinical side, which has necessitated cutting out some of the scientific matter concerning medical zoölogy. The editor explains this by his desire to follow the design of the author to make this manual a practical volume for those practising medicine in the tropics.

The text is clear and readable. It is illustrated by 22 color and 15 half-tone plates, 381 figures, 6 maps, and 38 charts, all of which are excellent. It is a book which belongs on the shelf of everyone who is interested in tropical diseases. MAZŸCK P. RAVENEL

The Sanitary Inspector's Handbook: A Manual for Sanitary Inspectors and Other Executive Public Health Officers—*By Henry H. Clay. (2d ed.) London: H. K. Lewis & Co., Ltd.*, 1936. 432 pp. Price, $4.75.

The work of the sanitary inspector has been developed to a higher point in England than in any other country. It has, in fact, been so far advanced that one might almost regard this calling as a profession. Like other professions, it has its specialists.

Courses of instruction are given at various approved places; and such subjects as physiology and hygiene, elementary physics and chemistry, and the technology of buildings are covered in the courses. A specified period of time must be spent in a public health department. Finally, an examination is given by the Royal Sanitary Institute and Sanitary Inspectors Examination Joint Board, those passing being given a certificate which is everywhere required by law in England and Wales for persons who are to be appointed inspectors.

The book is divided into 31 chapters and there are 95 illustrations. Among the chapters of particular interest to Americans are those which are devoted to nuisances, offensive trades, housing, lighting, water, smoke, drainage, plumbing, sewage and sewage disposal, refuse disposal, ventilation and heating, factories and workshops, dairies and slaughter-houses, protection and preservation of food, infection and disinfection, and vital statistics.

The attitude held in England as to the relation of nuisances to disease is described. The earliest laws for the abatement of nuisances were based simply on the discomfort which they produced rather than any idea of their relation to health. Later, the idea that epidemic disease was perhaps due entirely to the harmful effects of nuisances came to be generally held. Today nuisances are dealt with:

> . . . not because they, in fact, cause specific disease, but in order to afford and secure to the people fuller physical enjoyment of life: that by the removal of nuisances their surroundings may be made more pleasant, and because a healthy environment must obviously react favorably upon individual and public health.

Although the book explains much about the law of England and Wales and is not intended so much for American as for British use, there is a great deal that sanitarians will find applicable to conditions in the United States. It is today the best book of reference on the subject with which it deals.

The book is carefully written and by an authority, who is a Fellow of the Royal Sanitary Institute and Lecturer in Sanitary Engineering, London School of Hygiene and Tropical Medicine, University of London. The original edition was brought out in 1933 and replaced the well known volume on the same subject by Taylor, revised by Clarke, both of whom are now dead.

GEORGE A. SOPER

The Balanced Diet—*By Logan Clendening, M.D. New York: Appleton-Century*, 1936. 207 pp. Price, $1.50.

This little book of 207 pages presents in concise yet very readable form the fundamentals of nutrition. The author's breezy style holds one's interest from page to page and from chapter to chapter. This is a book for the layman who wishes to obtain without too much mental effort a knowledge of foods, diets, and their relation to human health. Of course in a semi-popular presentation of this sort it is necessary to make many generalities. This is the case in *The Balanced Diet*. Some of these generalizations are not fully true or proven and sometimes there are unmentioned exceptions to the stated rule. There are many quotations

from other writers to illustrate various viewpoints.

The chapter on food fads is one of the best. In this the author covers well such topics as fasting, aluminum scare, food acidity, and vegetarianism. The final chapter on The Economics of Food is so tersely dealt with that it might as well have been omitted. A set of food tables omitting minerals and vitamins is appended.

CARL R. FELLERS

Die Methoden der Wohnungshygiene—*By Karl Süpfle and Paul Hoffmann. In Abderhalden, Handbuch der biologischen Arbeitsmethoden,* Abth. IV, Teil 11, Heft 4, Leif. 431, pp. 559–770, 75 figs. in text, 1934. Price, R.M. 10.

This is a comprehensive treatise on the hygiene of the home or dwelling. It deals with the scientific methods of examination of the site; determination of air and water in the soil, its permeability, chemical constitution, bacterial content, temperature, level of ground water; building materials, with reference to their permeability by air and water, moisture capacity of mortar, deadening of sound, insulation against temperature changes and loss of heat, strength of materials, and protection against attack of wood-destroying fungi.

The problem of heating is discussed from the standpoint of determination of requirements, testing of installations, and calculation of dimensions of gas piping for stoves and heating equipment.

Ventilation requirements are computed on the basis of the production of CO_2, heat, and moisture by the occupants according to age. Air pressure is computed with reference to normal changes in temperature, and elaborate formulae are given for the measurements of the movement and rate of change in the air. Special attention is given to temperature, measurement and control of humidity and carbon dioxide content, and the the detection and measurement of the deadly carbon monoxide. Methods of testing for the amount of dust entering the home are described.

The problems of lighting are treated quantitatively from the standpoint of methods of determining the quantity and intensity, angles of dispersion, requirements in dimensions of windows, angles of panes, and optical qualities of various kinds of glass.

CHARLES A. KOFOID

BOOKS RECEIVED

AN AMERICAN DOCTOR'S ODYSSEY. By Victor Heiser, M.D. New York: Norton, 1936. 544 pp. Price, $3.50.

CASH RELIEF. By Joanna C. Colcord. New York: Russell Sage Foundation, 1936. 263 pp. Price, $1.50.

DISINFECTION AND STERILIZATION. By Ernest C. McCulloch, M.A., D.V.M., Ph.D. Philadelphia: Lea & Febiger, 1936. 525 pp., ill. with 53 engravings. Price, $5.50.

GYNECOLOGY AND OBSTETRICS. By Edwin Jameson, M.D. Vol. XVII, Clio Medica Series, edited by E. B. Krumbhaar. New York: Hoeber (Medical Book Department of Harper), 1936. 170 pp. Price, $2.00.

INTERIM REPORT TO THE NATIONAL RESOURCES COMMITTEE. By the Research Committee on Urban Problems, Clarence A. Dykstra, Chairman. Washington, July, 1936. 188 pp.

PHYSICIAN, PASTOR AND PATIENT: PROBLEMS IN PASTORAL MEDICINE. By George W. Jacoby, M.D. New York: Hoeber (Harper), 1936. 390 pp., ill. Price, $3.50.

PREVENTIVE MEDICINE (5th ed.). By Mark F. Boyd, M.D. Philadelphia: Saunders, 1936. 561 pp., ill. Price, $4.50.

THE PSYCHOLOGY OF ADOLESCENCE. By Luella Cole, Ph.D. New York: Farrar & Rinehart, 1936. 503 pp. Price, $3.50.

PUBLIC ADMINISTRATION. By John M. Pfiffner, Ph.D. New York: Ronald, 1935. 525 pp. Price, $4.00.

WATER PURIFICATION CONTROL (2d ed.). By Edward S. Hopkins. Baltimore: Williams & Wilkins, 1936. 184 pp. Price, $1.75.

YOUR HAY FEVER. By Oren C. Durham. With an Introduction by Morris Fishbein, M.D., and a Chapter on Treatment by Samuel M. Feinberg, M.D. New York: Bobbs-Merrill, 1936. 264 pp. Price, $2.00.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Tuberculosis Case Finding—Most tuberculous people are unaware of their infection, and the condition will not be diagnosed until the disease is far advanced. The most effective way of discovering early infections is by chest surveys of susceptible groups. If properly treated, the spread of the disease is prevented.

AMBERSON, J. B. Case Finding Methods for the Diagnosis of Tuberculosis. J.A.M.A. 107, 4:256 (July 25), 1936.

More about Tuberculosis Case Finding—Arguments are advanced for testing school children for tuberculosis and for the examination of adults in the homes of child reactors. Educational values in routine testing are emphasized.

BROWN, W. P. Economy in Tuberculosis Case Finding Through the Schools. Pub. Health Nurs. 28, 7:455 July), 1936.

Adequate Nutrition and Pregnancy—This discussion of maternity benefits and their effect upon the health of mothers and infants in Europe will make strange reading for us in this country.

BALFOUR, M. I. Nutrition as a Factor in Pregnancy and Childbirth. J. State Med. 44, 7:391 (July), 1936.

Mosquito Control on a Grand Scale—With 2,300 miles of reservoir shore line the extent of the malaria control problem in the Tennessee Valley is evident. From the extensive organization formed to attack the problem one may predict an effective program.

BISHOP, E. L. Malaria Control Activities of the Tennessee Valley Authority. Pub. Health Rep. 51, 29:970 (July 17), 1936.

Composite Ranking of Diseases and Defects—Looking beyond the ordinary mortality and morbidity tables an attempt is made to estimate the true position of the various diseases. The outstanding diseases are grouped: (1) influenza and pneumonia, tuberculosis, heart disease; (2) cancer, rheumatism, dementia precox; (3) syphilis, appendicitis, mental defect, results of childbirth. A stimulating study.

BRITTEN, R. N. Important Causes of Sickness and Death. Pub. Health Rep. 51, 29:947 (July 17), 1936.

Saving New-Born Babies—Steady declines in the neonatal and infant death rates in Chicago during the last 10 years indicate that measures found effective in hospital practice may be applied successfully to city-wide conditions. Prematurity is a great factor in infant deaths, and lack of antepartum and postnatal care influences deaths among premature babies. The infant hygiene program of the Chicago Health Department is described.

BUNDESEN, H. N., *et al.* Mortality of New-Born Infants in Chicago During 1935. J.A.M.A. 107, 4:270 (July 25), 1936.

Preventing Typhoid Fever — In general, typhoid prophylaxis is resorted to most frequently in those parts of the country with the greatest typhoid fever problem. Seasonal peaks of immunizations occur about 2 months before the peak of cases in anticipation of, rather than in the face of, epidemics.

COLLINS, S. D. History and Frequency of Typhoid Fever Immunizations and Cases in 9,000 Families. Pub. Health Rep. 51, 28:897 (July 10), 1936.

Marriage and Mental Health—Among persons admitted to mental hospitals, the rate was lowest for married people and, in order, higher for single people, widowed, and divorced. In the last group the rate was 4 times that of the married.

DAYTON, N. A. Marriage and Mental Disease. New Eng. J. Med. 215, 4:153 (July 23), 1936.

How Long Shall Unnecessary Maternal Deaths Continue?—Maternal death rates remaining high despite studies, surveys, reports, and resolutions, the demand is made that adequate prenatal services be effectively coördinated with decent lying-in and postpartum services. A definite program is outlined.

DUBLIN, L. I., and EMERSON, H. Maternal Mortality (A Symposium). New York State J. Med. 36, 13:1002 (July 1), 1936.

Fortified Milks—As prophylactics against rickets, both yeast-fed and irradiated vitamin D milk were found adequate. That higher vitamin D content was of additional value as a prophylactic was not established.

ELEY, R. C., *et al.* The Prophylactic Value of Vitamin D Irradiated and Vitamin D Yeast-Fed Milk. New Eng. J. Med. 215, 3:110 (July 16), 1936.

Unpleasant Thought-of-the-Month—Lymph nodes in 4 of 88 swine carcasses "passed for food" contained viable avian tuberculosis bacilli. The study is a reminder that virulent tubercle bacilli may be present in pork even though visible lesions of tuberculosis have been removed.

FELDMAN, W. H. The Recovery of Virulent Tubercle Bacilli from the Tissues of Swine Intended for Food. J. Infect. Dis. 59, 1:42 (July-Aug.), 1936.

Hospital Plumbing—Traced to a carrier in a hospital diet kitchen this unusual epidemic of paratyphoid fever mixed with other enteric organisms seems to have been spread largely through water contaminated with sewage.

FOLEY, A. R., and FAILLE, J. L. A Hospital Epidemic of Paratyphoid A. Canad. Pub. Health J. 27, 7:313 (July), 1936.

Viewers-with-Alarm Please Note—In Stockholm educated married couples have more children than do those in "lower" social strata.

HUTCHINSON, E. P. Education and Intramarital Fertility in Stockholm. Milbank Quart. Bull. 14, 3:285 (July), 1936.

European Experience with BCG—The vaccine is harmless and is of some value if used as an adjunct to other prophylactic measures. The author concludes that Calmette would serve the cause of immunization better had he remembered what Renan once said to an over-enthusiastic Pasteur: "Truth is a great coquette; she will not be sought with too much passion, but is often most amenable to indifference. She escapes when apparently caught, but gives herself up if patiently waited for."

KAYNE, G. G. BCG in Western Europe. Am. Rev. Tuberc. 34, 1:10 (July), 1936.

Are Colds Infectious?—Arguments are presented in defense of the postulate that the true common cold is not a communicable disease but a condition of faulty accommodation to unfavorable environment.

KERR, W. J. The Common Cold. J.A.M.A. 107, 5:323 (Aug. 1), 1936.

Treating Colds—Glib advice about taking your cold to bed, so dear to the heart of the health educator, was put to the test. Within the limitations of the study it was found that illness was shortened and complications were prevented when victims went immediately to bed as compared with those who waited 5 days before doing so.

LEBLANC, T. J., and WELBORN, M. B. The Common Cold and the Effect of Rest in Bed on Its Course. Am J. Hyg. 24, 1:10 (July), 1936.

Dependency and Physical Defects —One-fifth of all persons over 16 on relief rôles had serious physical handicaps. Evidence is presented that physical impairment is an important cause of dependency. Disabilities were 3 times as common in families on relief as among non-relief persons.

PERROTT, G. ST. J., and GRIFFIN, H. C. An Inventory of the Serious Disabilities of the Urban Relief Population. Milbank Quart. Bull. 14, 3:213 (July), 1936.

Occupational Therapy for Convalescents—In the industrial clinic at Leysin, Switzerland, work benches and motors have been installed near the beds in tuberculosis wards, so that bed patients have available miniature factories, while in the convalescent workshops much more complete equipment is provided. Work is adapted to the physical condition of each patient, and the psychological therapeutic effect is excellent.

ROLLIER, A. The Industrial Clinic at Leysin. Internat. Nurs. Rev. 10, 2:142, 1936.

Next Steps in Public Health—This memorandum, the last paper written by Edgar Sydenstricker, intended to serve as the basis for what is one of the outstanding meetings in the whole field of public health, is in reality a document of rare importance. The discussions that follow, contributions of the leaders in public hygiene, fully meet the promise of the introductory memorandum.

SYDENSTRICKER, E., *et al.* The Next Steps in Public Health. Proceedings of the Fourteenth Annual Conference of the Milbank Memorial Fund. Mar. 26, 1936.

Can Public Opinion Affect Maternal Deaths?—Let the blame for high British maternal mortality go where it belongs, concludes this writer: to a careless public, an inefficient midwife, an inept doctor, or a badly-run health department.

TOPPING, A. Maternal Mortality and Public Opinion. Pub. Health 49, 10:342 (July), 1936.

Influencing John Public's Behavior—What the municipal health department can and should do to stimulate popular support for its projects and public interest in personal health is briefly and convincingly set forth by one who knows from his own experience. First is individual contact, then group instruction, finally, general and supplementary information and publicity.

ZIMAND, S. The Educational Work of a Health Department. Pub. Health Nurs. 28, 7:446 (July), 1936.

ASSOCIATION NEWS

AMERICAN PUBLIC HEALTH ASSOCIATION
SIXTY-FIFTH ANNUAL MEETING
NEW ORLEANS, LA.

OCTOBER 20-23, 1936

For Preliminary Program, Railroad Fares, and Hotel Rates, see Supplement in back of Journal

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Richard M. Adams, M.D., State Health Department, Oklahoma City, Okla., State Director of County Health Units
Daniel C. Barrett, M.D., C.P.H., 3318 Browning Ave., Cincinnati, O., District Physician, City Health Department
John H. Cauley, M.D., 33 Adams St., Dorchester, Mass., Medical Inspector, Boston Health Dept.
Chadwick W. Christine, M.D., Flemingsburg, Ky., Fleming County Health Officer
James S. Cull, M.D., D.P.H., Pouce Coupe, B. C., Canada, Director, Peace River Health Unit
James O. Foster, M.D., Luverne, Ala., County Health Officer, Crenshaw County Medical Board
Max C. Igloe, M.D., Big Rapids, Mich., Director, Mecosta-Osceola Health Dept.
Lester C. Krotcher, M.D., Twin Falls, Idaho, Director, Twin Falls Health Unit
Leo M. Morse, M.D., C.P.H., First National Bank, Neillsville, Wis., District Health Officer, State Board of Health
Edward W. Palmer, Great Plain Ave., Needham, Mass., Acting Health Officer
Arthur O. Peters, M.D., 15 N. 4th St., Dayton, O., Commissioner of Health

Laboratory Section

Elizabeth L. Hazen, Ph.D., 440 Riverside Drive, New York, N. Y., Senior Bacteriologist, Division of Laboratories and Research, State Dept. of Health
Katherine H. Kramer, 136 Elder Ave., Lansdowne, Pa., Laboratory Technician
Meyer Samson, 1619 Spruce St., Philadelphia, Pa., Director, Samson Laboratories
Edna L. Smith, State Board of Health Laboratories, Jefferson City, Mo., Bacteriologist

Vital Statistics Section

Madge Proctor, 527 E. High, Jefferson City, Mo., Statistician, State Board of Health

Public Health Engineering Section

Herbert M. Bosch, District Health Unit No. 2, Mankato, Minn., District Public Health Engineer
Eldridge N. Brown, D.V.M., 1701 Sevier St., Nashville, Tenn., Veterinarian and Dairy Inspector
Michael E. Doyle, Box 424, Albany, Ga., District Sanitary Engineer, State Board of Health
Charles H. Field, Albany, Ga., Sanitary Engineer, Dougherty County Board of Health
Leon E. Johns, 218 S. West Fifth Ave., Ft. Lauderdale, Fla., Sanitary Officer, Broward County Health Dept.
Harold L. Malone, Coöperative Health Unit District No. 1, Tahlequah, Okla., Engineer
Edmund J. Marzec, 3231–4th Ave., Sioux City, Ia., Sanitary Engineer, Woodbury County Health Unit
Joseph J. Mooney, 707 Arbor St., Ann Arbor, Mich., Federal Trainee
Myhren C. Peterson, P. O. Box 443, Bemidji, Minn., District Public Health Engineer, State Dept. of Health

William D. Turner, Ph.D., Box 1, Havemeyer Hall, Columbia University, New York, N. Y., Assistant Professor of Chemical Engineering

Industrial Hygiene Section

Niles R. Bernz, 80 Maiden Lane, New York, N. Y., charge of Industrial Hygiene Division, Fidelity and Casualty Company of New York

John W. Dugger, M.D., Old Capitol Bldg., Jackson, Miss., Director, Division of Industrial Hygiene, State Board of Health

John M. Hepler, C.E., 320 W. Genesee St., Lansing, Mich., Director, Bureau of Industrial Hygiene, Dept. of Health (State)

Saul C. Rothmann, State Department of Health, Charleston, W. Va., Assistant Industrial Hygiene Engineer, Bureau of Industrial Hygiene

Kenneth D. Smith, M.D., 456 Elmwood Dr., Marion, O., Assistant Medical Director, Bureau of Occupational Diseases, State Dept. of Health

Emerson Venable, 414 S. Trenton Ave., Pittsburgh, Pa., Chemist, Dust Laboratory, Mine Safety Appliances Company

Food and Nutrition Section

A. J. Carlson, Ph.D., M.D., LL.D., University of Chicago, Chicago, Ill., Professor of Physiology, University of Chicago

Eugene E. Hamann, D.V.M., Rm. 205, City Hall, Lansing, Mich., Chief Sanitary and Food Inspector

Child Hygiene Section

James W. Chapman, M.D., 902 Broadway, Hannibal, Mo., Acting Director, Hannibal-Marion County Health Unit

Francis V. Corrigan, M.D., 610 Angell, Providence, R. I., Assistant Chief, Bureau of Child Hygiene, State Dept. of Health

Ruth E. Fairbank, M.D., 615 N. Wolfe St., Baltimore, Md., Psychiatrist, charge of Mental Hygiene Study, Johns Hopkins School of Hygiene and Public Health

Paul F. Fletcher, M.D., St. Louis University, School of Medicine, St. Louis, Mo., State Obstetrician

Public Health Education Section

Eva M. Adams, Health Department, Jackson, Miss., Director of Health Education

Theresa E. Boden, 195 Broadway, New York, N. Y., Assistant to Health Director, American Telephone and Telegraph Company

P. Bruce Brockway, M.D., 225 Michigan, Toledo, O., Director, Health Supervision, Board of Education

A. Barklie Coulter, M.D., 1150 Connecticut Ave., N.W., Washington, D. C., Director, Bureau of Tuberculosis, Dept. of Health

Vaikunthrai M. Desai, D.D.S., Central Bank Bldg., Esplanade Rd., Bombay, India, Director, Nair Hospital Dental Clinic

A. Louise Dietrich, R.N., 1001 E. Nevada St., El Paso, Tex., General Secretary, Texas Graduate Nurses Assn.

Margaret C. Klem, Social Security Board, Washington, D. C., Associate Social Statistician

Minnie K. Oed, R.N., 691 Seward Ave., Detroit, Mich., Nurse-Teacher, Health Education, Dept. of Health

Public Health Nursing Section

Margaret Leddy, 3312 Federal St., Camden, N. J., Supervising Nurse, Metropolitan Life Insurance Co.

Kathryn A. Schulte, R.N., 2875 W. 19 St., Chicago, Ill., Teacher, Public Health Nursing

Edith L. Soule, R.N., State Bureau of Health, Augusta, Me., Director, Division of Public Health Nursing

Epidemiology Section

Hollis S. Ingraham, M.D., State Dept. of Health, Albany, N. Y., Assistant Epidemiologist

Gerald N. Rein, M.D., 15715 Park Place N., E. Detroit, Mich., Medical Consultant, U. S. Public Health Service

Unaffiliated

Samuel E. Hershey, D.V.M., Box 283, Charleston, W. Va., Consulting State Veterinarian

Walter M. Smith, M.D., M.P.H., State Board of Health, Little Rock, Ark., Director, Training Center

DECEASED MEMBERS

John B. Derrickson, M.D., Georgetown, Del., Elected Member 1932

Frederick McD. Harkin, M.D., Marquette, Mich., Elected Member 1935

William S. Yates, M.D., Junction City, Kans., Elected Member 1934

APPLICANTS FOR FELLOWSHIP

(*Additions to list published in July Journal*)

HEALTH OFFICERS SECTION

William B. Grayson, M.D., Little Rock, Ark.

Gordon L. Hastings, M.D., M.P.H., Little Rock, Ark.

Norris C. Knight, M D, C P H, Clarksdale, Miss.
Ernest M. Morris, M.D., Fall River, Mass.

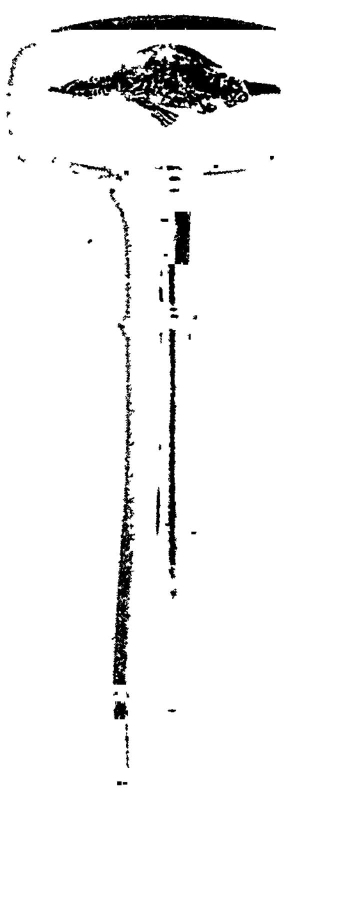
FOOD AND NUTRITION SECTION
Max J Mackler, Ph C, C P.H, Tampa, Fla.

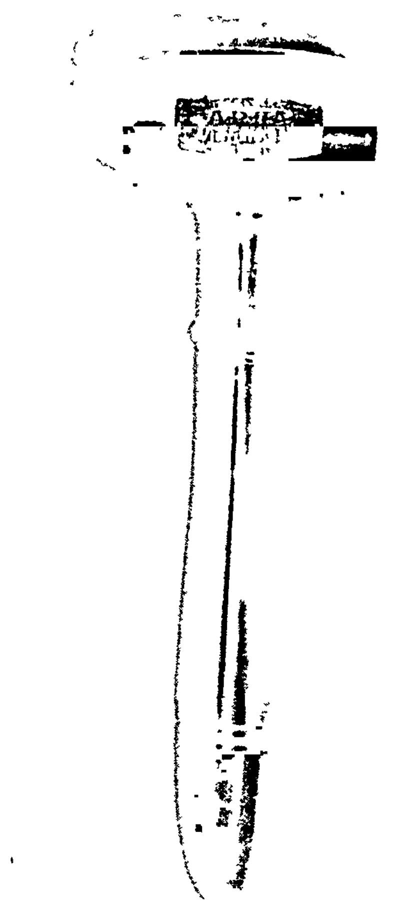
EPIDEMIOLOGY SECTION
Ernest L Stebbins, M D, C P H, Rochester, N Y

LABORATORY SECTION
George A. Denison, M D., Birmingham, Ala.
William H. Gaub, M.S, C.P.H, Nashville, Tenn.
Katherine Marden, M S, Hartford, Conn.

PUBLIC HEALTH EDUCATION SECTION
Adelaide Arfsten, B A., San Francisco, Calif.
Kenneth W. Grimley, M S, Birmingham, Ala
Nathan Sinai, M S, D P H, Ann Arbor, Mich

PHOTOGRAPH OF THE GAVEL PRESENTED TO THE WESTERN BRANCH AMERICAN PUBLIC HEALTH ASSOCIATION BY DR. H. E. YOUNG AT THE ANNUAL DINNER DURING THE SEVENTH ANNUAL MEETING IN VANCOUVER, B. C., JUNE 26, 1936





Seventh Annual Meeting
American Public Health Association (Western Branch)

Vancouver, British Columbia, Canada.
June 24th to 27th, 1936.

Presentation of Gavel.

THE OAK WOOD USED IN THE HEAD OF THE GAVEL PRESENTED TO THE WESTERN BRANCH OF THE AMERICAN PUBLIC HEALTH ASSOCIATION BY THE PRESIDENT-ELECT, DR. H. E. YOUNG, PROVINCIAL HEALTH OFFICER OF BRITISH COLUMBIA, WAS TAKEN FROM THE TIMBERS OF THE S.S. "BEAVER."

History of "Beaver"

Keel laid 1834 at yards of Green, Wigram & Green, Blackwall, England.

"Steam navigation was still in its infancy, but the committee of the Hudson's Bay Company decided to utilize the new mode of transportation for their distant western outposts in the North Pacific. They were motivated chiefly by the necessity of overcoming the difficulty of navigating the Columbia River bar, and by the need for faster and more reliable communications between the outposts than could be guaranteed by sailing-vessels.

"The maritime history of the north-west Pacific for fifty-three years is linked with the career of this sturdy pioneer steamer.

"In order to meet the manifest difficulties of crossing the oceans from the River Thames to the River Columbia, and to meet the primitive and dangerous conditions in the far west, the vessel was constructed with the greatest possible care."—*Norman Hacking: "Early Marine History of British Columbia."*

The woods used in the construction of the ship were oak, elm, teak, and greenheart.

Her engines were made by the firm of Boulton & Watt, they were 35 nominal horse-power each, two engines being used to turn the paddles. Her length was 101 feet 4 inches, while her outside width was 33 feet, her paddle-boxes measuring 6 feet 6 inches each in width. Her register was a trifle over 109 tons, she was armed with 5 nine-pounder guns, and carried a crew of twenty-six men.

Mrs. John Labouchere christened the vessel on May 2nd, 1835. On August 29th of the same year she set sail for the north-west coast of America, her machinery having been placed in position, but her side-wheels being shipped on deck.

On April 10th, 1836, she dropped anchor opposite Fort Vancouver on the Columbia River. Soon afterwards the engineers turned their attention to the engines and we read that they "found them to answer very well."

From the time of her arrival at Fort Vancouver the "Beaver" made many a trip up and down the coast, trading with the Indians, collecting furs, carrying Hudson's Bay officers between their different posts, and taking her part in the establishing of new ones, notably Fort Victoria, which was built in 1843, much of the material and all the supplies for the new fort having been carried in the hold and on the decks of the Company's first steamer. The "Beaver" took part in the establishing of the Colony of British Columbia, when on November 19th, 1858, having taken Governor Douglas, Chief Justice David Cameron, Rear-Admiral Baynes, Matthew Begbie, Capt. John Grant, and a detachment of Royal Engineers to Fort Langley, where commissions were read, oaths administered, and British Columbia was officially proclaimed as a Crown colony.

In 1863 the vessel was leased to the Imperial Government and served until 1870 as a survey-ship under Capt. Daniel Pender, R.N.

Upon return to the Company in 1870 she was extensively repaired. She was converted into a tow-boat in 1874 and sold to a private company. She was badly burned in 1880, sank in Burrard Inlet in 1883, but was repaired and returned to service as solid as ever.

The B.C. Towing and Transportation Company operated her until 1888, when she was again licensed to carry passengers, operating between the different logging camps. While engaged in this service she struck a rock at Prospect Point at the entrance to Vancouver Harbour on the night of July 26th, 1888.

For four years she lay there abandoned to the ravages of souvenir-hunters and the tempestuous elements of the weather, when the swell from the steamer "Yosemite" one day caused her to work loose and fall into the channel, thus losing to posterity one of the most historic hulls on the Pacific Coast.

THE HANDLE OF THE GAVEL IS AFRICAN TIMBER TAKEN FROM A DUNDEE-BUILT WHALER NAMED "JAPAN."

NEWS FROM THE FIELD

MEETINGS IN PORTUGAL AND SPAIN ADJOURNED

DUE to the war in Spain, the meeting of the International Union Against Tuberculosis, which was to be held September 7–10, in Lisbon, Portugal, has been adjourned.

The Third International Congress on Malaria, which was to be held October 12–18, in Madrid, has also been adjourned.

HENRY S. WELLCOME

SIR Henry S. Wellcome, British scientist and explorer, and head of the firm of Burroughs, Wellcome & Co., London, manufacturers of chemicals and drugs, died July 25, at the age of 83.

Sir Henry S. Wellcome was a native of Wisconsin who became a British citizen by naturalization during the World War. He founded the Wellcome Bureau of Scientific Research in 1911 and later the Tropical Research Laboratories and the Gordon Memorial College at Khartoum, Africa. In 1927 he founded the Lady Stanley Maternity Hospital in Uganda, Central Africa. He was internationally known for his researches in pharmacy and allied subjects.

CONFERENCE ON EDUCATIONAL BROADCASTING

THE First National Conference on Educational Broadcasting under the auspices of the United States Office of Education and the Federal Communications Commission will be held in Washington, D. C., December 10, 11, 12, 1936. This conference is widely sponsored by various organizations and is for the purpose of enabling persons who are interested in educational broadcasting to discuss means by which radio may become a more effective instrument for education, both formal and informal. It is planned also to serve as a clearing house for information on the latest technical and professional developments in educational broadcasting and to enable persons representing all phases of the subject to become acquainted and to exchange ideas and experiences. The American Public Health Association has been invited to be represented at this meeting.

CONNECTICUT MARRIAGE LAW

SINCE January 1, 1936, it has been compulsory for men and women desiring a license to marry in Connecticut to have a blood test for syphilis.

Up to July 6, according to the Connecticut State Health Department, about 1 blood test out of every 100 made at the state department of health laboratories had been reported distinctly positive for syphilis.

MOTHERS' MILK PRESERVING PROCESS

PEDIATRICIANS in New York City saw new hope for saving the lives of an increasing number of prematurely born babies when, on July 24, the Mothers' Milk Bureau of the Children's Welfare Federation announced the adoption of a new process of quickly freezing mothers' milk.

The process was invented by Washington Platt, a scientist in the Syracuse, N. Y., research laboratory of The Borden Company, and was clinically tested by Dr. Paul W. Emerson of Boston. It makes it possible for the first time to keep mothers' milk for several months or more, transport it,

and feed it to prematurely born or ill babies without any subsequent action other than thawing and warming.

A license for the use of the new process, without charge, was turned over to the Federation by The Borden Company during ceremonies on July 24. James A. Tobey, Dr.P.H., Director of Health Service of The Borden Company, made the presentation.

RESEARCH FELLOWSHIPS

ACCORDING to *Science,* the British Medical Research Council has announced that three junior fellowships will be offered immediately, for award to qualified medical men wishing to receive training with a view to careers in research work in tropical medicine. Preference will be given to candidates who have already had preliminary experience of methods of research in some branch of medical science and the fellowships will be tenable for three years, the first year to be spent at a school of tropical medicine; the second in doing research in some institution; and the third largely in work under direction at some center in the tropics. Further information can be found in the August 14 issue of *Science,* page 149.

PROGRESS UNDER SOCIAL SECURITY ACT

"AMPLE proof that the Social Security Act is sound and workable is furnished by the progress achieved during the few months it has been in existence. Every state in the Union, plus Alaska, Hawaii, and the District of Columbia, is coöperating with the federal government in one or another of the various activities encouraged by this Act.

"Thirty-four states and the District of Columbia are already coöperating in the program of pensions to needy aged, needy blind, and dependent children. Of these, 32 states have plans which take care of 629,000 aged; 19 states have plans which take care of 185,000 dependent children, and 21 states have plans which take care of 21,000 needy blind. The total number covered under these various plans in the 35 states is 835,000 persons. Although funds were made available by Congress only 4 months ago $25,000,000 will have been granted the states by the end of this month for use in financing these state plans.

"In addition, 14 states have enacted unemployment compensation laws, 12 of which have already been approved by the Board. These 12 laws cover approximately 7,200,000 workers or 40 per cent of the total that will be covered when all the states enact similar laws. . . .

"Every effort has been made not to hamper the forces of recovery now running so strongly. With that end in view the social security program has been adjusted to go into effect by easy stages. . . . Right now we have a million old people over 65 years of age being supported out of public funds. We also have over 3,000,000 employable persons being supported out of public funds. The proportion of the aged who will need to be supported by the government will most certainly continue to increase, if we may judge from the experience of older countries.

"Regardless of whether or not we have a social security act it will still be necessary to maintain persons who become dependent in their old age and it will still be necessary to feed the unemployed. The Social Security Act merely undertakes to make a more equitable and a more systematic distribution of existing costs. In so doing it does not seek to rob life of its challenge, but to provide some minimum protection against those hazards which would otherwise be overwhelming."—Arthur J. Altmeyer, Acting Chairman, Social Security Board. Broadcast June 15, 1936.

NORTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION

OFFICERS for 1936 elected by the Northern California Public Health Association at its annual meeting are as follows:

President—Earl H. Coleman, M.D., Fresno
President-Elect—W. H. Kellogg, M.D., Berkeley
Vice-President—Louis Olsen, Palo Alto
Treasurer—Helen S. Hartley, Stockton
Secretary—I. O. Church, M.D., Oakland
Representative to the Regional Board of the Western Branch A.P.H.A.—Richard G. Soutar, Jr., M.D., Sacramento
Representative on the Governing Council of the A.P.H.A.—J. C. Geiger, M.D., San Francisco

PERSONALS

LYNN M. GARNER, M.D., member A.P.H.A., Director, Miller County Health Department, Tuscumbia, Mo., was appointed Director of the Greene County Health Department, to succeed John W. Williams, Jr., M.D., member A.P.H.A. Dr. Williams is to take charge of a division of the Missouri State Health Department.

JEAN V. LATIMER, F.A.P.H.A., has recently been appointed to the position of Coördinator of Health Education for the Division of Child Hygiene, Massachusetts Department of Public Health, with offices at Boston.

ROGER W. TRUESDAIL, PH.D., member A.P.H.A., President and Director of the Truesdail Laboratories, Inc., at Los Angeles, Calif., announces the appointment of three new staff members. They are:

C. E. P. Jeffreys, Ph.D., Research Chemist and Bacteriologist. Dr. Jeffreys has been the recipient, for the past 2 years, of a Rockefeller Foundation Grant for Medical Research at the California Institute of Technology. He is one of the "abstractors" of *Chemical Abstracts*.

Marion G. Sharp, Nutritionist.

Irving G. Halpern, Chemist.

J. C. GEIGER, M.D., F.A.P.H.A., Director of Public Health, City and County of San Francisco, Calif., sailed July 21 on the S.S. Mariposa for the South Sea Islands, Australia, and New Zealand, for a vacation. He was accompanied by his wife and daughter.

MATTHEW H. GRISWOLD, M.D., of Kensington, Conn., Health Officer of Berlin, has been appointed public health physician in the Connecticut State Department of Health to specialize in cancer work, a newly created position. The state survey was made possible with funds granted to the State Health Department by the 1935 legislature under a bill sponsored by the Connecticut State Medical Society. Dr. Griswold will coöperate with the Tumor Committee of the State Medical Society in its cancer program. About 16 clinics are now operating at general hospitals in the state, as a result of the Society's program, and others are planned.

ADRIAN L. CARSON, JR., M.D., member A.P.H.A., Health Officer of Fairfax County, Va., has been named Director of the Bureau of Maternal and Child Hygiene of the Virginia State Health Department.

EDWARD M. HOLMES, JR., M.D., member A.P.H.A., of Richmond, Va., has been appointed Health Officer of Fairfax County, to succeed Adrian L. Carson, Jr., M.D.

DR. JOHN A. MALMSTROM has resigned as Health Officer of Virginia, Minn., to return to private practice.

NATALE COLOSI, M.S., PH.D., has been appointed General Director of the Parkway Hospital, New York, N. Y. Dr. Colosi has served as instructor in Bacteriology at New York University College of Medicine and is a member of the teaching staff of Wagner College, Staten Island, New York.

CONFERENCES AND DATES

Aug. 31–Sept. 12, Harvard Tercentenary Conference of Arts and Sciences, Cambridge, Mass.

Sept. 1–4, Annual Conference, Governmental Research Association, Ann Arbor, Mich.

Sept. 2–4, Annual Convention, National Shade Tree Conference, Hotel Statler, Boston, Mass.

Sept. 2–4, Union of Nova Scotia Municipalities, Digby, Nova Scotia.

Sept. 2–4, Annual Meeting, Ontario Municipal Association, Toronto, Ont.

Sept. 7–9, Cancer Institute, University of Wisconsin, Madison, Wis.

Sept. 7–10, International Union Against Tuberculosis, Lisbon, Portugal. *Adjourned because of unrest in Spain.*

Sept. 7–11, Sixtieth Anniversary Meeting, American Chemical Society, Pittsburgh, Pa.

Sept. 7–12, Third World Power Conference, National Power Policy Committee, Department of the Interior Building, Washington, D. C.

Sept. 9–12, Annual Meeting, American Forestry Association, Hotel Lakeside, Eagles Mere, Pa.

Sept. 14–17, Annual Convention, League of California Municipalities, Santa Monica, Calif.

Sept. 14–17, Annual Meeting, California Sewage Works Association, Santa Monica, Calif.

Sept. 15–30, First International Congress of Sanatoria and Private Nursing Homes; Margitsziget, Sanatorium, Budapest, Hungary.

Sept. 21–23, Annual Convention, American Institute of Park Executives and the American Park Society, South Bend, Ind.

Sept. 21–23, Annual Meeting, Rocky Mountain Section—American Water Works Association, Denver, Colo.

Sept. 22–25, Annual Meeting—New England Water Works Association, Pennsylvania Hotel, New York, N. Y.

Sept. 23–25, Annual Meeting of the New York State Association of Dairy and Milk Inspectors, Van Curler Hotel, Schenectady, N. Y.

Sept. 23–26, Mississippi Valley Conference on Tuberculosis, The Mississippi Valley Sanatorium Association, Hotel Pere Marquette, Peoria, Ill.

Sept. 24–25, League of Wisconsin Municipalities, Manitowoc, Wis.

Sept. 28, 29, Third Annual Meeting, Rocky Mountain Tuberculosis Conference, Franciscan Hotel, Albuquerque, N. M.

Sept. 28–30, Public Works Congress—American Society of Municipal Engineers—International Association of Public Works Officials, Toronto, Ont.

Sept. 28–Oct. 1, American Society of Municipal Engineers, Toronto, Ont., Canada.

Sept. 28–Oct. 2, American Hospital Association, Cleveland, Ohio

Sept. 28–Oct. 2, American Assn. of Port Authorities, San Francisco, Calif.

Oct. 1–3, Southern Tuberculosis Conference, Hot Springs, Ark.

Oct. 2, 3, Public Meeting—on Water Supply, Flood Control, and Pollution—of the Interstate Commission on the Delaware River Basin; Buckwood Inn, Shawnee-on-the-Delaware, Pa.

Oct. 5–9, Annual Safety Congress and Exposition, National Safety Council, Atlantic City, N. J.

Oct. 6–12, Fire Prevention Week.

Oct. 9, 10, New York State Sewage Works Association, Geneva, N. Y.

Oct. 10–18, National Dairy Show, National Dairy Assn., Dallas, Tex.

Oct. 12, 13, Canadian Dental Association, Montreal, Que.

Oct. 12–15, Annual Convention—Southwest Section, American Water Works Association, Fort Smith, Ark.

Oct. 12–16, Public Ownership League, Springfield, Ill.

Oct. 12–17, The Dairy Industries Exposition, Atlantic City, N. J.

Oct. 12–18, Third International Congress on Malaria, Madrid, Spain. *Adjourned because of unrest in Spain.*

Oct. 14–16, Annual Convention, Pennsylvania Water Works Association, Haddon Hall, Atlantic City, N. J.

Oct. 14–17, Annual Civil Service Assembly of the United States and Canada, Cincinnati, Ohio.

Oct. 15, 16, Annual Convention—New York Section, American Water Works Assn., Saratoga Springs, N. Y.

Oct. 17–25, Centennial Exposition Dairy Show, Atlantic City, N. J.

Oct. 19–20, Conference of State Sanitary Engineers, New Orleans, La.

Oct. 19–21, Annual Meeting, International City Managers' Association, Richmond, Va.

Oct. 20–23 (Tues., Wed., Thurs., Fri.), Sixty-fifth Annual Meeting of the American Public Health Association, New Orleans, La. Meetings Headquarters, Municipal Auditorium; Residence Headquarters, Hotel Roosevelt.

Oct. 20–23, New Orleans, La.:

- American Association of School Physicians.
- American Association of State Registration Executives.
- Association of Women in Public Health.
- Conference of State Laboratory Directors.
- International Society of Medical Officers of Health.
- National Committee of Health Council Executives.
- State Conference of Sanitary Engineers.

Oct. 21–23, Ontario Hospital Association, Toronto, Ont.

Oct. 21–24, Annual Civil Service Assembly of the United States and Canada, Cincinnati, Ohio

Oct. 23, 24, Annual Convention—New Jersey Section, American Water Works Association—jointly with the New Jersey Association of Water Superintendents; Hotel Ambassador, Atlantic City, N. J.

Oct. 26–28, Annual Meeting—Missouri Valley Section, American Water Works Association, Iowa City, Ia.

DIRECTORY OF EXHIBITS
(Continued)

65th Annual Meeting, American Public Health Association
October 20-23, Municipal Auditorium, New Orleans, La.

PHILIP MORRIS & CO., LTD., INC.
New York, N. Y.
Booth 17

PRECISION SCIENTIFIC COMPANY
Chicago, Ill.
Booth 107

E. R. SQUIBB & SONS
New York, N. Y.
Booth 55

VITEX LABORATORIES, INC.
Harrison, N. J.
Booth 25

WALLACE & TIERNAN CO., INC.
Newark, N. J.
Booths 60 and 61

THE WANDER COMPANY
Chicago, Ill.
Booth 68

WINTHROP CHEMICAL COMPANY, INC.
New York, N. Y.
Booth 63

WISCONSIN ALUMNI RESEARCH FOUNDATION
Madison, Wis.
Booths 105 and 106

Positions Wanted

HEALTH OFFICERS

Physician, M.D. N. Y. Medical College and Flower Hospital; extension course for public health officer, N. Y. State Department of Health; 3 years' urologic service in various New York City hospitals; desires position as health officer or in social hygiene department. A-266

Physician, M.D. University of Nebraska; 13 years' experience as city or county health officer in different sections of the West; desires position as health officer. Prefers West Coast. A-267

Physician, M.D. University of Michigan; Certificate in Education, University of Michigan; brief experience as supervisor of and medical consultant to two health surveys of the U. S. Public Health Service; is interested in a position as health officer or in the field of public health education. A-268

Physician, M.D. Indiana University; C.P.H. Johns Hopkins University; special courses in epidemiology, bio-statistics and public health administration; several years' experience as physician to city health department; desires position as full-time county health officer. A-269

Physician, M.D., Ph.D., University of Minnesota; desires administrative position in the field of public health. Experience includes several years as instructor of obstetrics at a university and five years as director of a Bureau of Maternity, Infancy and Child Hygiene in a county health department. Available now. A-238

Physician, M.D., Western Reserve University, 3 months Health Officers' course at Johns Hopkins; 1 years' experience as instructor of Hygiene and Bacteriology, 4 months as county health officer; desires position as health officer or in the field of research. A-273

LABORATORY

Young woman, M.S. Alabama Polytechnic Institute; special courses in pathology, public health, parasitology and micro-technic; desires position as assistant bacteriologist. L-270

Young woman, B.S. Tufts College; M.S. University of Illinois; Ph.D. Western Reserve University; 4 years' experience as director of city health department laboratory and several years' experience in both commercial and hospital laboratories; desires position doing research or routine in chemistry, biochemistry, bacteriology or serology in public health laboratory. L-272

ENGINEERS

Young man, married, graduate in Civil Engineering, experience with Board of Health of Chicago; desires position in public health engineering. Preferably in the West. E-271

MISCELLANEOUS

Physician, graduate of Washington University Medical School, desires position with state department of public health to do educational writing on mental hygiene, child guidance or venereal diseases. Capable of group instruction in health education. 197

Young man, M.D. Vanderbilt University; Sc.D. Johns Hopkins School of Hygiene and Public Health; Dr.P.H. Harvard University; several years' experience as laboratory instructor and research associate; desires position as epidemiologist or teacher of public health and parasitology. M-263

Physician, M.D. Harvard University; several years' experience as instructor of industrial medicine and as consultant in occupational diseases; desires position in industrial hygiene. A-228

Positions Available

UNITED STATES CIVIL SERVICE EXAMINATIONS

MEDICAL OFFICER, $3,800 A YEAR
ASSOCIATE MEDICAL OFFICER, $3,200 A YEAR
ASSISTANT MEDICAL OFFICER, $2,600 A YEAR

Optional branches.—To become eligible, applicants must qualify in at least one of the following optional branches, *and must state in their applications the branch, or branches, desired:*

1. Cardiology.
2. Cancer diagnosis and treatment.
3. Eye, ear, nose and throat (singly or combined).
4. Genitourinary (urology).
5. Internal medicine and diagnosis.
6. Neuropsychiatry.
7. Pathology and bacteriology.
8. Roentgenology.
9. Surgery—(*a*) General, (*b*) Chest, (*c*) Orthopedic.
10. Tuberculosis.
11. Venereal disease—(*a*) Clinical, (*b*) Public health.
12. Industrial medicine.
13. General practice.

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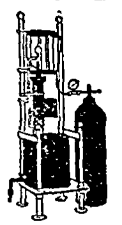

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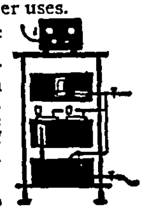

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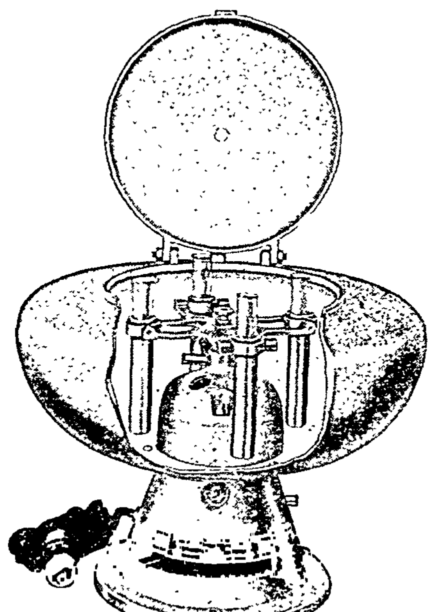

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PRELIMINARY PROGRAM

SIXTY-FIFTH ANNUAL MEETING

American Public Health Association

NEW ORLEANS, OCTOBER 20-23, 1936

THE AMERICAN PUBLIC HEALTH ASSOCIATION
50 West 50th Street New York, N. Y.

TABLE OF CONTENTS

PRELIMINARY PROGRAM OF THE SIXTY-FIFTH ANNUAL MEETING AMERICAN PUBLIC HEALTH ASSOCIATION

New Orleans, La., October 20–23, 1936

THE Annual Meeting Program Committee presents the Preliminary Program of the scientific sessions of the Sixty-fifth Annual Meeting of the American Public Health Association and information concerning meetings of related organizations.

This program is incomplete and perhaps inaccurate in some respects. The affiliations of speakers have been omitted, but will be published in full in the Final Program. Delegates are urged to consult the Final Program, available at the Registration Desk in the Auditorium at the time of the meeting.

Tuesday, 9:30 A.M.

MENTAL HYGIENE

Special Session—Auditorium, Auditorium

Presiding: Grant Fleming, M.D.

The Mental Hygiene Component of Baby Hygiene Clinics in Baltimore. Ruth Fairbank, M.D.

Practicability and Results of Mental Hygiene in a School System. Charles E. Shepard, M.D.

Mental Hygiene in a Public Health Program. W. T. B. Mitchell, M.D.

Practical Aspects of Public Mental Hygiene. B. Liber, M.D.

Mental Hygiene Service in a City Department of Health. Eric Kent Clarke, M.D.

Mental Hygiene in a Provincial Health Department. B. T. McGhie, M.D.

VITAL STATISTICS

First Session—Committee Room 58, Auditorium

Training of Vital Statisticians. John Sundwall, M.D., Ph.D.

The Rôle of Vital Statistics in Medical Science. W. F. Walker, Dr.P.H.

What Is Wrong with Our Computation of Automobile Fatality Rates? Henry L. Porsche and Phillip Stein.

A Preliminary Report of the Health Inventory of Cities. George St. J. Perrott.

Tuesday, 9:30 A.M.

PUBLIC HEALTH ENGINEERING SECTION AND CONFERENCE OF STATE SANITARY ENGINEERS

Joint Session—Concert Hall, Auditorium

Presiding: JOHN H. O'NEILL, *Chairman,* Conference of State Sanitary Engineers.

Résumé of Activities Tending Toward a National Program of Stream Pollution Control. R. E. TARBETT.

The Interstate Sanitation Compact and Its Implications. C. A. HOLMQUIST.

Discussion. ELLIS S. TISDALE and ARTHUR D. WESTON.

Revised Standards for Design and Sanitation of Bathing Places. (Progress Report of the Joint Committee on Bathing Places.) *Chairman,* W. J. SCOTT.

Hot Air Sterilization of Milk Utensils. (Report of the Joint Committee on Milk Supply.) *Chairman,* C. A. HOLMQUIST.

Water Storage, Conditioning and Cleansing of Shellfish. (Report of the Committee on Shellfish.) *Chairman,* L. M. FISHER.

Progress Report of the Joint Committee on Plumbing. *Chairman,* J. I. CONNOLLY.

Announcements.

FOOD AND NUTRITION

First Session—Committee Room 339, Auditorium

Presiding: WALTER S. FRISBIE, *Vice-Chairman,* Food and Nutrition Section.

Report of the Committee on Foods. *Chairman,* B. E. PROCTOR, PH.D.

Problems in Food Preservation. Address of the *Section Chairman,* FRED W. TANNER, PH.D.

Shrimp Inspection. J. O. CLARKE.

Inspection of Cream for Butter Making. SARAH VANCE DUGAN.

Rodent Control in Food Establishments. ROY C. MOORE.

Meat Sanitation. L. B. JENSEN, PH.D.

Use of Apple Powder in the Prevention and Cure of Summer Diarrheas. IRA A. MANVILLE, M.D., PH.D.

AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

First Session—Assembly Hall North, Auditorium

For program see page 21.

Tuesday, 9:30 A.M.

EPIDEMIOLOGY

First Session—Assembly Hall South, Auditorium

Epidemiological Studies in Influenza. THOMAS FRANCIS, JR., M.D.

New Epidemiological and Immunological Studies of Rabies. LESLIE T. WEBSTER, M.D.

A Contribution to the Epidemiology of Measles. FRANKLIN H. TOP, M.D.

Immunity to Virus Diseases. ERNEST W. GOODPASTURE, M.D.

LABORATORY

First Session—Memorial Hall North, Auditorium

Presiding: RUTH GILBERT, M.D., *Chairman,* Laboratory Section.

Address of the *Chairman* of the Laboratory Section. RUTH GILBERT, M.D.

Section Business:

Report of the Committee on Scientific Exhibits. *Chairman,* FRED O. TONNEY, M.D.

Report of the Committee on Aspects of Veterinary Public Health. *Chairman,* R. V. STONE, D.V.M.

Report of the Committee on Biological Products. *Chairman,* WILLIAM H. PARK, M.D.

Report from Section Archivist. A. B. WADSWORTH, M.D.

Report of the Coördinating Committee on Standard Methods. *Chairman,* MAJOR A. PARKER HITCHENS, M.D.

Report of the Standard Methods Committee on Diagnostic Procedures and Reagents. *Chairman,* W. D. STOVALL, M.D.

Report of Representatives of Committees Outside of the Laboratory Section and Other Special Reports.

Tuesday, 10:30 A.M.

(Second Session—Meeting concurrently in Memorial Hall South, Auditorium)

The Virus of Lymphogranuloma Inguinale. RIGNEY D'AUNOY, M.D.

New Methods for the Laboratory Diagnosis and Treatment of Gonococcal Infections. CHARLES M. CARPENTER, M.D. *(Motion Picture.)*

Tuesday, 10:30 A.M.

LABORATORY

Second Session—Memorial Hall South, Auditorium

(Please note this session begins at 10:30. From 9:30 to 10:30 the Laboratory Section is requested to convene in Memorial Hall North for the conduct of section business.)

Presiding: W. D. STOVALL, M.D., *Vice-Chairman*, Laboratory Section.

A Laboratory Technic for Sanitary Air Analysis. W. F. WELLS.

Normal Sheep Cell Amboceptor in Wassermann Sera. C. A. STUART, PH.D., and HENRY WELCH, PH.D.

Human Deaths from Rabies and the Efficacy of Rabies Vaccine. Author to be selected.

Rabies in Louisiana. RIGNEY D'AUNOY, M.D., and JOHN H. CONNELL, M.D.

Tuesday, 12:30 P.M.

INDUSTRIAL HYGIENE

Luncheon Session—Room E, Hotel Roosevelt

Report of the Committee on Standard Practices in the Problem of Compensation of Occupational Diseases. *Chairman*, HENRY H. KESSLER, M.D., PH.D.

PUBLIC HEALTH EDUCATION

Luncheon Session—Dome Room, Hotel Roosevelt

Presiding: W. W. BAUER, M.D., *Chairman*, Public Health Education Section.

Use of the Department in the Journal Devoted to Health Education. EVART G. ROUTZAHN.

DIPHTHERIA IMMUNIZATION

Luncheon Session—Tip Top Room, Hotel Roosevelt

Preliminary Report of the Committee on Diphtheria Immunization Study.

EDWARD S. GODFREY, M.D.
DONALD T. FRASER, D.P.H.
V. K. VOLK, M.D.
G. FOARD MCGINNES, M.D.
WILLIAM H. PARK, M.D.
WALTER T. HARRISON, M.D.
W. E. BUNNEY, PH.D.

Tuesday, 2:30 P.M.

STATE REGISTRATION EXECUTIVES

Assembly Hall North, Auditorium

ADVANCES IN PUBLIC HEALTH

Special Session—Concert Hall, Auditorium

Presiding: ROBERT E. WODEHOUSE, M.D.

Recent Advances in Administrative Technic. HENRY F. VAUGHAN, DR.P.H.

Recent Advances in the Control of Pneumonia. RUFUS COLE, M.D.

Recent Trends in Engineering Practice. ABEL WOLMAN.

Recent Progress in Health Education Methods. WILLIAM P. SHEPARD, M.D.

Recent Contributions to Laboratory Methods. W. D. STOVALL, M.D.

Housing as a Public Health Problem. C.-E. A. WINSLOW, DR.P.H.

Tuesday, 6:30 P.M.

ASSOCIATION OF WOMEN IN PUBLIC HEALTH

Dinner Session—Gold Room, Hotel Roosevelt

Tuesday, 7:00 P.M.

SOUTHERN BRANCH—AMERICAN PUBLIC HEALTH ASSOCIATION

Dinner—Tip Top Room, Hotel Roosevelt

Tuesday, 8:00 P.M.

FIRST GENERAL SESSION

Concert Hall, Auditorium

Invocation. DEAN W. H. NES, Christ Church Cathedral, New Orleans, La.

Addresses of Welcome:
J. M. BATCHELOR, M.D.
ALFRED D. DANZIGER
J. A. O'HARA, M.D.
F. R. GOMILA, M.D.

Address of the President-elect of the American Public Health Association. THOMAS PARRAN, M.D.

Announcement of the Sedgwick Memorial Medal Award

Reception to the President and the President-elect.

Dancing.

Wednesday, 8:00 A.M.

YALE ALUMNI

Breakfast Session—Room E, Hotel Roosevelt

HARVARD UNIVERSITY ALUMNI

Breakfast Session—Room G, Hotel Roosevelt

Wednesday, 9:30 A.M.

HEALTH OFFICERS

First Session—Concert Hall, Auditorium

Statistical Study of Deaths in New Orleans since 1850. A. E. FOSSIER, M.D.

Discussion. J. M. BATCHELOR, M.D.

Relation of Bovine Mastitis to Human Disease. PAUL B. BROOKS, M.D., and WALTER VON D. TIEDEMAN.

The Need for and Value of an Intensive Program of Health Education in State Health Departments. FELIX J. UNDERWOOD, M.D.

Public Health Problems in Leprosy. H. E. HASSELTINE, M.D.

PUBLIC HEALTH ENGINEERING

First Session—Memorial Hall South, Auditorium

Observations on the Use of Copper and Chloramines in Water Purification. A. E. GRIFFIN.

Institutional and Other Small Water Treatment Plants to Meet Unusual Conditions. F. R. SHAW.

Further Study of Water-borne Typhoid Fever Outbreaks—1930-1935. (Report of the Committee on Water Supply.) *Chairman,* A. E. GORMAN.

Recent Developments Regarding Disposal of Pulp and Paper Mill Wastes. C. M. BAKER.

Discussion. C. E. GREEN.

Progress Report of the Committee on Waterways Pollution. *Chairman,* L. F. WARRICK. To be presented by title only.

Section Business.

Report of the Section Committee on Fellowship and Membership. *Chairman,* MORRIS COHN.

Public Health Engineering Content of an American Museum of Hygiene. GORDON M. FAIR.

Report of Section Nominating Committee and Election of Officers.

Wednesday, 9:30 A.M.

LABORATORY

Third Session—Committee Room 103—Auditorium

Presiding: RUTH GILBERT, M.D., *Chairman*, Laboratory Section.

International Biological Standardization. GEORGE W. MCCOY, M.D.

Laboratory Problems in the Control of Meningococcus Meningitis. ROSS L. LAYBOURN.

Laboratory Diagnosis of Meningitis Outbreaks. MAJOR A. PARKER HITCHENS, M.D.

Culturing of Meningococci. LUTHER THOMPSON, PH.D.

Active and Passive Immunization Against Tularemia. H. J. SHAUGHNESSY, PH.D., T. C. GRUBB, and ALBERT C. FAUTH.

The Standardization of Typhoid and Paratyphoid Vaccines. 1. The Value of the Gates Apparatus and Total Nitrogen Determination. ROY F. FEEMSTER, M.D., DR.P.H., LESLIE H. WETTERLOW, B.S., and JOSEPH CIANCIARULO, PH.C.

The Growth of Bacteria in Body Fluids. ANNA DEAN DULANEY, PH.D.

The Current Incidence of C. Diphtheriae Mitis and Gravis. (*Illustrated.*) JOHN L. WHITE, M.D.

INDUSTRIAL HYGIENE

First Session—Committee Room 339, Auditorium

Address of the Chairman. ALBERT S. GRAY, M.D.

Review of Research Methods and Progress in Industrial Sanitation. THEODORE HATCH.

Industrial Hygiene Study of Foundry Industry in New York State. LEONARD GREENBURG, M.D., PH.D.

Compensation Aspects of Occupational Diseases. WESLEY GRAFF.

Importance of the Supervisor in the Industrial Health Program. LEVERETT D. BRISTOL, M.D.

Section Business.

PUBLIC HEALTH EDUCATION

First Session—Memorial Hall North, Auditorium

The Newspaper-Science in the Press—The Daily, the Weekly, and the Interests of the Readers of Each. HOWARD BLAKESLEE.

Discussion.

The Radio. JUDITH WALLER.

Discussion. ELIZABETH C. NICKERSON and HENRY F. VAUGHAN, DR.P.H.

Wednesday, 9:30 A.M.

FOOD AND NUTRITION AND LABORATORY SECTIONS

Joint Session—Auditorium, Auditorium

SYMPOSIUM ON MILK AND DAIRY PRODUCTS

Presiding: FRED W. TANNER, PH.D., *Chairman,* Food and Nutrition Section and ROBERT S. BREED, PH.D., *Chairman,* Standard Methods Committee on Milk and Dairy Products.

Regulations, Standards and Manufacturing of Ice Cream. (Report of Committee on Milk and Dairy Products, Food and Nutrition Section.) F. W. FABIAN, PH.D.

Discussion. W. B. PALMER, *Chairman.*

Methods and Significance of Cream and Butter Sediment Test. E. H. PARFITT.

Some Problems in the Sanitary Control of Counter Ice Cream Freezers. C. A. ABELE.

Proposed Changes in the Standard Methods for the Examination of Milk. ROBERT S. BREED, PH.D.

Report of the Committee on Vitamin D Milk. *Chairman,* E. M. NELSON, PH.D.

CHILD HYGIENE

First Session—Assembly Hall South, Auditorium

Maternal Mortality at the Chicago Maternity Center. BEATRICE E. TUCKER, M.D., and HARRY B. W. BENARON, M.D.

Infant Mortality in New York City. JOHN L. RICE, M.D., MARGARET W. BARNARD, M.D., THOMAS J. DUFFIELD, and JULES BLUMENTHAL, M.D.

Infant and Maternal Welfare from the Aspect of Social Security. MARTHA ELIOT, M.D.

PUBLIC HEALTH NURSING

First Session—Assembly Hall North, Auditorium

Section Business.

State Problems—Final Report of the Committee to Study Public Health Nursing in State Health Departments. MARIAN SHEAHAN, R.N.

Discussion. PEARL MCIVER, R.N., and NAOMI DEUTSCH, R.N.

Content for Section in American Museum of Hygiene.

STATE REGISTRATION EXECUTIVES

Committee Room 58, Auditorium

Wednesday, 12:30 P.M.

PUBLIC HEALTH EDUCATION

Luncheon Session—Dome Room, Hotel Roosevelt

Presiding: W. W. BAUER, M.D., *Chairman,* Public Health Education Section.

Public Health Around the World. CLAIR E. TURNER, DR.P.H.

DELTA OMEGA

Luncheon Session—Gold Room, Hotel Roosevelt

Wednesday, 2:30 P.M.

LABORATORY

Fourth Session—Assembly Hall South, Auditorium

SYMPOSIUM ON ENTERIC FEVERS

Presiding: W. D. STOVALL, M.D., *Vice-Chairman,* Laboratory Section, and MARION B. COLEMAN, *Referee,* for Serological and Bacteriological Procedures in the Diagnosis of Enteric Fevers.

Typhoid Vaccine Studies: II. Protective Antibodies in the Blood Serum of Vaccinated Individuals. Laboratory Staff of the Army Medical School, Washington, D. C. Presented by COLONEL J. F. SILER.

Discussion: T. F. SELLERS, M.D.

A Study of the Antigenic Fraction of Typhoid Bacilli Isolated from Carriers and Cases and the Antibody Content of the Serum of These Patients. LOIS ALMON and W. D. STOVALL, M.D.

Discussion: A. L. MACNABB, D.V.M.

Practical Procedures in the Laboratory Diagnosis of Typhoid and Related Fevers. T. F. SELLERS, M.D.

Discussion: RUTH GILBERT, M.D., and ROSS L. LAYBOURN.

Bacillary Dysentery in the United States. A. V. HARDY, M.D.

Discussion: G. FOARD MCGINNES, M.D., and ROSS L. LAYBOURN.

VI Antigen in Carrier Strains of Eberthella Typhosa. HENRY WELCH, PH.D., and FRIEND LEE MICKLE, SC.D.

Standards for Determining the Suitability of Bile Specimens for Detection or Release of Typhoid Carriers. F. C. FORSBECK, M.D., and HARRIET C. HOLLON.

Discussion: RUTH GILBERT, M.D.

AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

Second Session—Concert Hall, Auditorium

For program see page 21.

Wednesday, 2:30 P.M.

VITAL STATISTICS

Second Session—Committee Room 58, Auditorium

Report of the Committee on Accident Statistics. ROBERT J. VANE, *Acting Chairman.*

Report of the Committee on Forms and Methods of Statistical Practice. *Chairman,* A. W. HEDRICH, SC.D.

Report of the Committee on Registration of Births Out of Wedlock. *Chairman,* J. V. DEPORTE, PH.D.

Report of the Committee to Study Death Certification. *Chairman,* MARJORIE T. BELLOWS.

Report of the Committee on Scientific Exhibits. *Chairman,* JESSAMINE S. WHITNEY.

Report of the Section Committee on American Museum of Hygiene.

Report of the Nominating Committee.

Reports are to be submitted in writing to the Secretary of the Vital Statistics Section and distributed prior to the meeting. The time will be devoted to discussion.

Election of Officers.

Suggestions for Improvement of Vital Statistics Section and Programs.

PUBLIC HEALTH ENGINEERING

Second Session—Memorial Hall South, Auditorium

Inaugurating Grade A Pasteurized Milk in the City of Chicago. HERMAN N. BUNDESEN, M.D.

Discussion. LESLIE C. FRANK.

Public Health Features in Milk Plant Layout. RALPH E. IRWIN.

Discussion. GEORGE W. PUTNAM.

A Study of Air Pollution in New York City. SOL PINCUS.

Discussion. E. B. PHELPS.

Report of the Committee on Sewage Disposal. *Chairman,* LANGDON PEARSE.

Report of the Committee on Municipal Public Health Engineering. *Chairman,* WILLIAM H. CARY, JR.

Report of the Committee on Promotion of Environmental Sanitation. *Chairman,* V. M. EHLERS.

Progress Report of the Committee on Summer Camps and Roadside Places. *Chairman,* E. D. RICH.

Wednesday, 2:30 P.M.

FOOD AND NUTRITION

Second Session—Assembly Hall North, Auditorium

Presiding: FRED W. TANNER, PH.D., *Chairman,* Food and Nutrition Section.

Mineral Elements in Metabolism. (*Report of Committee on Nutritional Problems.*) *Chairman,* D. B. JONES, PH.D.

Nutritional-Economics of Dietetic Calcium. F. L. GUNDERSON, PH.D.

Fundamentals of Dental Health. GUY S. MILLBERRY, D.D.S., and NINA SIMMONDS, D.Sc.

Recent Trends in Pellagra. WILLIAM DEKLEINE, M.D.

Rationale of Antirachitic Procedure. FRED O. TONNEY, M.D.

The Question of Acid and Alkaline Forming Foods. J. A. TOBEY, DR.P.H.

Diet and Resistance to Infection. A Review of Recent Studies. CHARLES F. CHURCH, M.D.

HEALTH OFFICERS, EPIDEMIOLOGY AND LABORATORY SECTIONS

Joint Session—Auditorium, Auditorium

SYMPOSIUM ON SYPHILIS

Presiding: JOHN P. KOEHLER, M.D., *Chairman,* Health Officers Section, KENNETH F. MAXCY, M.D., DR.P.H., *Chairman,* Epidemiology Section, and RUTH GILBERT, M.D., *Chairman,* Laboratory Section.

Administrative Aspects. J. N. BAKER, M.D.

Epidemiological Aspects. GEORGE H. RAMSEY, M.D.

Laboratory Aspects. A. H. SANFORD, M.D.

Discussion: To be opened by THOMAS PARRAN, M.D.

Wednesday, 6:30 P.M.

PUBLIC HEALTH ENGINEERING SECTION AND CONFERENCE OF STATE SANITARY ENGINEERS

Dome Room, Hotel Roosevelt

Annual Engineers Stag Dinner.

WILLIAM J. ORCHARD, *Toastmaster.*

PUBLIC HEALTH EDUCATION

Dinner Session—Room E, Hotel Roosevelt

Presiding: W. W. BAUER, M.D., *Chairman,* Public Health Education Section.

Business Session.

Wednesday, 6:30 P.M.

HEALTH OFFICERS

Dinner Session—Tip Top Room, Hotel Roosevelt

Presiding: JOHN P. KOEHLER, M.D., *Chairman*, Health Officers Section, and J. N. BAKER, M.D.

Thursday, 8:00 A.M.

JOHNS HOPKINS ALUMNI

Breakfast Session—Room E, Hotel Roosevelt

MASSACHUSETTS INSTITUTE OF TECHNOLOGY ALUMNI

Breakfast Session—Room G, Hotel Roosevelt

ASSOCIATION OF SCHOOL PHYSICIANS

Breakfast Session—Room C, Hotel Roosevelt

Thursday, 9:30 A.M.

VITAL STATISTICS SECTION AND STATE REGISTRATION EXECUTIVES

Joint Session—Memorial Hall North, Auditorium

TESTS AND PROMOTION OF REGISTRATION OF BIRTHS AND DEATHS AND INTERPRETATION OF THEIR SIGNIFICANCE

Presentation of Problem and Methodology of Past—Federal and State. W. J. V. DEACON, M.D.

Analysis of Experiences Gleaned from Morbidity Surveys. SELWYN D. COLLINS, PH.D.

Survey of Methods of Testing Completeness of Registration. LOWELL J. REED, PH.D.

Institutional Mortality with Reference to Residence Allocation. ELIZABETH PARKHURST.

Proper Distribution and Duties of County and Local Registrars. LEONARD V. PHELPS.

CHILD HYGIENE

Second Session—Memorial Hall South, Auditorium

Round Table Discussion of Maternal and Child Health Problems with a View of Developing Greater Coöperation of Various Public and Private Agencies.

Business Meeting.

Thursday, 9:30 A.M.

LABORATORY

Fifth Session—Committee Room 103, Auditorium

Presiding: RUTH GILBERT, M.D., *Chairman,* Laboratory Section, ROBERT S. BREED, PH.D., and JOHN F. NORTON, PH.D.

Report of the Committee on Water Pollution Studies. *Chairman,* JAMES A. NEWLANDS.

Report of the Standard Methods Committee on Examination of Water and Sewage. *Chairman,* JOHN F. NORTON, PH.D.

Report of the Standard Methods Committee on Examination of Dairy and Food Products. *Chairman,* ROBERT S. BREED, PH.D.

Report of the Committee on Milk Pasteurization Studies. *Chairman,* GEORGE J. HUCKER, PH.D.

Nomenclature for the Colon Group. JOHN F. NORTON, PH.D., and ROBERT S. BREED, PH.D.

A Comparison of Solid with Liquid Media as a Means of Determining the Presence of Lactose Fermenting Bacteria in Pasteurized Milk. M. W. YALE, PH.D.

The Bacteriology of Septic Sore Throat Epidemics. GEORGE J. HUCKER, PH.D.

Discussion: JULIA M. COFFEY and JAMES G. MCALPINE, PH.D.

A Comparison of the Standard with the Modified Methylene Blue Reduction Technic. H. R. THORNTON, PH.D.

The Standardization of Tablets for Determining Methylene Blue Reduction in Milk. H. J. CONN, PH.D.

HEALTH OFFICERS AND PUBLIC HEALTH NURSING SECTIONS AND AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

Joint Session—Auditorium, Auditorium

The Use of Lay Boards by Official Health Agencies. OLIVIA PETERSON, R.N.

Discussion. BURKE DIEFENDORF, M.D.

The Control of Pneumococcus Pneumonia. EDWARD S. ROGERS, M.D.

Care of Communicable Disease in the Home.

Public Health Nursing. ALMA C. HAUPT, R.N.

Health Officer. JOHN J. SIPPY, M.D.

Illinois School Health Activities. FRANK J. JIRKA, M.D.

Thursday, 9:30 A.M.

LABORATORY AND FOOD AND NUTRITION SECTIONS

Joint Session—Assembly Hall North, Auditorium

SYMPOSIUM ON FOOD POISONING

Presiding: FRED W. TANNER, PH.D., *Chairman,* Food and Nutrition Section, and STEWART A. KOSER, PH.D., *Referee,* Laboratory Diagnostic Procedures in the recognition of Various Food Poisonings, representing the Laboratory Section.

Consumer Claims and Their Economic Importance to the Food Processing Industries. R. W. PILCHER, PH.D.

Epidemiology and Symptomatology of Staphylococcus Food Poisoning: A Report of Recent Outbreaks. GEORGE A. DENISON, M.D.

Staphylococci in Relation to Food Poisoning. G. M. DACK, PH.D., M.D.

Factors Affecting the Production and Potency of Staphylococcic Toxins. G. J. HUCKER, PH.D., and W. C. HAYNES.

Foods—The Importance of Preventing the Addition of Medicinal Substances and the Necessity for Keeping Foreign Material, and Added Poisons to a Minimum Amount. GEORGE H. MARSH.

Committee Report from Laboratory Section on Advisability of Laboratory Examination of Food Handlers. *Chairman,* MINNA CROOKS YOUNG.

Discussion. FRED W. TANNER, PH.D., and LEON BANOV, M.D.

INDUSTRIAL HYGIENE AND PUBLIC HEALTH ENGINEERING SECTIONS

Joint Session—Concert Hall, Auditorium

Presiding: A. P. MILLER, *Chairman,* Public Health Engineering Section, and ALBERT S. GRAY, M.D., *Chairman,* Industrial Hygiene Section.

The Application of Engineering Surveys to the Hatters' Fur Cutting Industry. J. J. BLOOMFIELD and J. M. DALLA VALLE.

Rôle of the Public Health Engineer in Industrial Hygiene and Sanitation. W. SCOTT JOHNSON.

Report of the Committee on Industrial Sanitation of the Public Health Engineering Section. *Chairman,* C. L. POOL.

Program of the Foundry Industry for Dust Control. E. O. JONES.

Industrial Hygiene Activities in the United States. R. R. SAYERS, M.D.

Section Business.

Thursday, 9:30 A.M.

EPIDEMIOLOGY

Second Session—Assembly Hall South, Auditorium

Active Immunization Against Whooping Cough: Interim Report of the Cleveland Experience. J. A. DOULL, M.D., and Associates.

The Epidemiology of Rural Tuberculosis. A. H. GRAHAM, M.D.

Reaction of Young Adults to Alum Precipitated Diphtheria Toxoid. RUTH E. BOYNTON, M.D., and RALPH V. ELLIS, M.D.

The Nature of Autarceologic Susceptibility to Poliomyelitis. W. LLOYD AYCOCK, M.D.

Thursday, 12:30 P.M.

COMMITTEE ON PROFESSIONAL EDUCATION

Special Luncheon—Dome Room, Hotel Roosevelt

Presiding: W. S. LEATHERS, M.D., *Chairman,* Committee on Professional Education.

Title to be announced. MILTON J. ROSENAU, M.D.

FOOD AND NUTRITION

Luncheon Session—La Louisiane

Thursday, 7:00 P.M.

SECOND GENERAL SESSION

Banquet—Tip Top Room, Hotel Roosevelt

The Dynamics of Public Health. HENRY E. SIGERIST, M.D.

Recognition of Members Joining the Association before 1897.

Announcement of Health Conservation Contest Awards.

Dancing.

Friday, 9:30 A.M.

INDUSTRIAL HYGIÈNE

Second Session—Memorial Hall South, Auditorium

Pneumonia and Tuberculosis Among Industrial Workers and Their Dependents. C. H. KIBBEY, M.D.

Industrial Morbidity and Mortality. D. K. BRUNDAGE.

Manganese Poisoning in Industry. W. D. MCNALLY, M.D.

Health Hazards in the Dry-Cleaning Industry. WILLIAM H. CARY, JR., and JOHN M. HEPLER.

Friday, 9:30 A.M.

VITAL STATISTICS

Third Session—Committee Room 58, Auditorium

The Prevention of Accidents as a Health Department Activity. EDWARD S. GODFREY, JR., M.D.

Uses of Life Tables in Vital Statistics Work. LOUIS I. DUBLIN, PH.D., and ALFRED J. LOTKA, D.SC.

A Statistical Study of Stillbirths in Hospitals. ELIZABETH C. TANDY, D.SC.

Measurement of Error of Death Rates in the Colored Race. RUTH PUFFER.

LABORATORY, FOOD AND NUTRITION AND PUBLIC HEALTH ENGINEERING SECTIONS

Joint Session—Concert Hall, Auditorium

SYMPOSIUM ON THE SANITATION OF EATING UTENSILS

Presiding: MAJOR A. PARKER HITCHENS, *Chairman,* Committee on the Sanitation of Eating Utensils; FRED W. TANNER, PH.D., *Chairman,* Food and Nutrition Section, and A. P. MILLER, *Chairman,* Public Health Engineering Section.

The Epidemiological Basis for Demanding Clean Dishes. LEON BANOV, M.D.

The Bacteriological Basis for Demanding Clean Dishes. STUART MUDD, M.D.

A Standard Technic for the Bacteriological Examination of Eating Utensils and Wash Water. LIEUTENANT COLONEL JAMES GORDON CUMMING, M.D., DR.P.H.

A Standard Technic for the Use of Test Organism in Determining the Efficiency of Dishwashing Devices. R. V. STONE, D.V.M.

A Proposed Standard Method for the Bacteriological Examination of Glassware and China. C. R. FELLERS, PH.D.

A Critical Study of Various Types of Dishwashing Devices. J. I. CONNOLLY.

A Critical Study of Various Types of Detergents and Disinfectants Recommended for Use in Dishwashing. W. L. MALLMANN, PH.D.

The Administrative Control of Dishwashing. GEORGE C. RUHLAND, M.D.

Report of the Committee on the Sanitation of Eating Utensils. *Chairman,* MAJOR A. PARKER HITCHENS.

Friday, 9:30 A.M.

LABORATORY

Sixth Session—Memorial Hall North, Auditorium

SYMPOSIUM ON INTESTINAL PARASITES INCLUDING PROTOZOA

Presiding: RUTH GILBERT, M.D., *Chairman,* Laboratory Section, and W. D. STOVALL, M.D., *Vice-Chairman.*

The Laboratory Diagnosis of Amebiasis. W. H. KELLOGG, M.D.

The Practical Value and Significance of the Complement-Fixation Reaction in Amebiasis. HENRY E. MELENEY, M.D., and WILLIAM W. FRYE, PH.D.

Some Observations on the Practical Value of the Complement-Fixation Test in the Diagnosis of Amebiasis. CHARLES F. CRAIG, M.D., M.A. (Hon.), Col. U. S. Army, Retired.

The Decline of Amebic Dysentery in Chicago. A Study of Cyst Varieties During and Following the Chicago Epidemic of Amebic Dysentery. BERTHA KAPLAN SPECTOR, PH.D.

Intestinal Parasite Survey in Alabama. I. A Comparative Study of Two Hookworm Anthelmintics. W. H. Y. SMITH, M.D., J. G. MCALPINE, PH.D., and D. G. GILL, M.D., D.P.H.

Tapeworm Infestations in the Southern United States. T. F. SELLERS, M.D., and E. J. SUNKES.

Laboratory Procedures as Aids in the Diagnosis of Trichinosis. LUCY HEATHMAN, PH.D., M.D.

PUBLIC HEALTH EDUCATION AND CHILD HYGIENE SECTIONS

Joint Session—Auditorium, Auditorium

SCHOOL HEALTH EDUCATION

Presiding: W. W. BAUER, M.D., *Chairman,* Public Health Education Section.

A Modern Concept of Education. FANNIE B. SHAW.

Discussion. A. D. BROWNE, M.D.

The Function of the School in the Rural Program. RUTH GROUT.

Discussion. CARA L. HARRIS.

Appraising the Educational Content of a Health Service Program. GEORGE T. PALMER, DR.P.H., and MAYHEW DERRYBERRY, PH.D.

Friday, 9:30 A.M.

HEALTH OFFICERS

Second Session—Assembly Hall North, Auditorium

The Development of Full-Time District Health Administration in Mexico. JOSÉ SIUROB, M.D.

City Health Department Work in the Field of Housing. L. M. GRAVES, M.D.

Points of Interest in a Survey of Maternal Mortality. J. D. DOWLING, M.D.

International Health Indices. I. S. FALK, PH.D.

Actions of Health Officers Invalidated by the Courts. JAMES A. TOBEY, DR.P.H.

PUBLIC HEALTH NURSING SECTION AND AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

Joint Session—Assembly Hall South, Auditorium

N.O.P.H.N. Survey and the School Nursing Situation. DOROTHY DEMING, R.N.

School Nursing in a Generalized Nursing Program. GRACE ROSS, R.N.

Discussion. AMELIA GRANT, R.N.

Development and Correction of Defective Speech in Children. FREDERICK VAN DOREN MARTIN, M.D.

Advantages of Nursery Schools. C. L. OUTLAND, M.D.

Friday, 12:30 P.M.

BUSINESS PROBLEMS OF THE HEALTH DEPARTMENT

Special Luncheon—Dome Room, Hotel Roosevelt

ROUND TABLE CONFERENCE

Presiding: WALTER N. KIRKMAN.

Health Department Financing and Social Security Budgets

Property Accounting in a State Health Department

Questions, Answers, and Discussion.

Friday, 2:30 P.M.

MOSQUITO-BORNE DISEASES

Special Session—Concert Hall, Auditorium

Presiding: CHARLES F. CRAIG, Colonel, U. S. Army, Ret.

Newer Epidemiology of Yellow Fever. FRED L. SOPER, M.D.

Malaria Control—Some Comments on the Past and Future. T. H. D. GRIFFITTS, M.D.

Discussion. A. H. FLETCHER, and S. L. WADLEY, M.D., C.P.H.

Friday, 2:30 P.M.

PUBLIC HEALTH EDUCATION

Second Session—Assembly Hall South, Auditorium

CLINIC ON PUBLICITY MATERIAL

(Criteria will be furnished by which the audience may evaluate samples shown.)

Literature. H. E. KLEINSCHMIDT, M.D.

Exhibit Material. THOMAS G. HULL, M.D.

Radio—Electrically Transcribed. BURT R. RICKARDS.

CHILD HYGIENE SECTION AND AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

Joint Session—Assembly Hall North, Auditorium

The Place of Physical Education in Schools. VAUGHN S. BLANCHARD.

Discussion. JESSIE R. GARRISON.

Some Experiences with Vitamin D with Children. PAUL A. ROTHFUSS, M.D.

Heliotherapy in Its Application to Conditions Found in School Children. CHARLES J. BLOOM, M.D.

The Economic Factor in School Child Health. WALTER S. CORNELL, M.D.

MEETINGS OF OTHER ORGANIZATIONS

AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

Tuesday, 9:30 A.M. First Session—Assembly Hall North, Auditorium

Presidential Address. CHARLES C. WILSON, M.D.

School Health Administration. EDWARD S. GODFREY, M.D.

Health Service in Schools. FELIX J. UNDERWOOD, M.D.

Dental Care for Children. WALTER T. McFALL, D.D.S.

Wednesday, 2:30 P.M. Second Session—Concert Hall, Auditorium

Study of Child's Sleep. GLENVILLE GIDDINGS, M.D.

Some Experiences with Tonsillectomy. J. L. BOWMAN, M.D.

Health Education. FANNIE B. SHAW.

Thursday, 8:00 A.M. Room C, Hotel Roosevelt. Business Session. Breakfast.

Thursday, 9:30 A.M. Auditorium, Auditorium. Joint Session with Health Officers and Public Health Nursing Sections. (See page 15.)

AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

Friday, 9:30 A.M. Assembly Hall South, Auditorium. Joint Session with Public Health Nursing Section. (See page 20.)

Friday, 2:30 P.M. Assembly Hall North, Auditorium. Joint Session with Child Hygiene Section. (See page 21.)

ASSOCIATION OF WOMEN IN PUBLIC HEALTH

Tuesday, 6:30 P.M. Gold Room, Hotel Roosevelt. Dinner.

CONFERENCE OF STATE LABORATORY DIRECTORS

Monday, October 19, 10:30 A.M. Room A, Hotel Roosevelt

Monday, 12:30 P.M. Room C, Hotel Roosevelt. Luncheon.

Monday, 2:30 P.M. Room A, Hotel Roosevelt

DELTA OMEGA

Wednesday, 12:30 P.M. Gold Room, Hotel Roosevelt. Luncheon.

HARVARD UNIVERSITY ALUMNI

Wednesday, 8:00 A.M. Room G, Hotel Roosevelt. Breakfast.

CONFERENCE OF STATE SANITARY ENGINEERS

Monday, October 19, 9:30 A.M. Memorial Hall North, Auditorium

Monday, 2:30 P.M. Memorial Hall North, Auditorium

Tuesday, 9:30 A.M. Concert Hall, Auditorium. Joint Session with Public Health Engineering Section. (See page 4.)

Wednesday, 6:30 P.M. Dome Room, Hotel Roosevelt. Annual Engineers' Stag Dinner.

JOHNS HOPKINS ALUMNI

Thursday, 8:00 A.M. Room E, Hotel Roosevelt. Breakfast.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY ALUMNI

Thursday, 8:00 A.M. Room G, Hotel Roosevelt. Breakfast.

YALE ALUMNI

Wednesday, 8:00 A.M. Room E, Hotel Roosevelt. Breakfast.

STATE REGISTRATION EXECUTIVES

Tuesday, 2:30 P.M. Assembly Hall North, Auditorium

Wednesday, 9:30 A.M. Committee Room 58, Auditorium

Thursday, 9:30 A.M. Memorial Hall North, Auditorium. Joint Session with Vital Statistics Section. (See page 14.)

EXHIBITORS AT THE SIXTY-FIFTH ANNUAL MEETING

The following will present exhibits of products and equipment of value in health protection and promotion:

American Institute of Laundering
The Borden Company
Carnation Milk Sales Company
Difco Laboratories, Inc.
Eisele & Company
The J. B. Ford Sales Company
Fruit Dispatch Company
Geuder, Paeschke & Frey Company
Gilliland Laboratories
Golden Guernsey, Inc.
Hanovia Chemical & Manufacturing Company
Horlick's Malted Milk Company
Hygeia, The Health Magazine
Irradiated Evaporated Milk Institute
Jackson Brewing Company
Kellogg Company
Krim-Ko Company
Lederle Laboratories, Inc.
Libby, McNeill & Libby
Louisiana Department of Conservation
The Macmillan Company
J. A. Majors Company
Metropolitan Life Insurance Company
National Dairy Council
National Live Stock and Meat Board
Pet Milk Sales Company
Philip Morris & Co., Ltd., Inc.
Precision Scientific Company
E. R. Squibb & Sons
Vitex Laboratories, Inc.
Wallace & Tiernan Co., Inc.
The Wander Company
Winthrop Chemical Company, Inc.
Wisconsin Alumni Research Foundation

GENERAL INFORMATION

MEETING HEADQUARTERS

The Municipal Auditorium in New Orleans is official headquarters for the 65th Annual Meeting. All scientific sessions, except meal-time meetings, will be held here. Here also the commercial and scientific exhibits, registration and information will be established, as well as Association Offices, and Health Education and Publicity Center.

BREAKFASTS, LUNCHEONS, AND DINNERS

Most of these will be held in the Hotel Roosevelt. A few will be scheduled at some of the French restaurants, famous for Creole cooking.

HOTELS

While the Hotel Roosevelt will be residence headquarters for many, other New Orleans hotels are well worthy of patronage. Page 26 lists them, with their rates. All, including the Roosevelt, are equally distant from the Auditorium—approximately six blocks.

CLOTHING

The weather in New Orleans in October is mild and warm, but not hot. Light weight clothing is recommended.

Ordinary summer attire will be comfortable and appropriate with a light wrap or top coat for cool evenings. Such clothing is suitable for Florida and Havana as well. Delegates who are taking the post-convention trip should bring bathing suits if they want to take advantage of the opportunity to swim at Miami Beach.

RAILROAD RATES

It is expected that winter excursion rates to New Orleans will be in effect as usual after October 1. Since these are less than the convention fares, no identification certificates for Annual Meeting travel will be issued by the Association this year.

Delegates are urged to consult their local ticket agents for the most advantageous round trip fares available from their point of departure.

The rates from various centers to New Orleans are as follows:

RAILROAD RATES FROM VARIOUS CENTERS TO NEW ORLEANS, LA.

	Regular Rate One Way	*Regular Rate Round Trip*	*Special Round Trip*	*One Way Lower Berth*	*One Way Upper Berth*
Atlanta, Ga.	$14.82	$19.80*		$3.75	$3.00
Baltimore, Md.	34.70	47.10*	$46.70†	8.00	6.40
Boston, Mass.	46.35	72.10*	67.70†	11.25	9.00
Buffalo, N. Y.	38.40	60.05*	52.50†	9.00	7.20
Chicago, Ill.	28.13	37.55*	37.55†	6.75	5.40
Cincinnati, O.	25.24	33.65*	33.65†	6.00	4.80
Cleveland, O.	28.70	48.95*	46.10†	8.00	6.40
Dallas, Tex.	15.62	21.35**		4.25	3.40
Denver, Colo.	39.69	67.20**	53.35†	9.75	7.80
Detroit, Mich.	33.05	49.35*	46.45†	8.00	6.40
Duluth, Minn.	41.80	55.75**	55.80†	9.75	7.80
Fort Worth, Tex.	16.57	22.60**		4.25	3.40
Indianapolis, Ind.	25.95	40.25*	36.70†	6.00	4.80
Jacksonville, Fla.	18.38	24.50*		4.25	3.40
Kansas City, Kan.	26.50	35.35**	35.35†	6.00	4.80
Louisville, Ky.	23.23	31.00*	31.00†	5.50	4.40
Los Angeles, Cal.	59.86		102.00‡	14.00	11.20
Memphis, Tenn.	11.83	15.80*		3.00	2.40
Milwaukee, Wis.	30.68	40 95**	40.95†	6.75§	5.45§
Minneapolis, Minn.	38.42	51.25**	51.25†	9.25	7.40
Nashville, Tenn.	18.35	24.50*		4.25	3.40
New York, N. Y.	40.30	58.30*	55.80†	9.75	7.80
Omaha, Nebr.	32.48	43.35**	43.35†	8.25	6.60
Philadelphia, Pa.	37.60	52.90*	51.40†	9.00	7.20
Pittsburgh, Pa.	34.60	52.35*	46.70†	8.00	6.40
Portland, Ore.	78.26	126.40‡		19.00	15.20
Salt Lake City, Utah	53.84	71.80**	73.45†	14.00	11.20
San Francisco, Calif.	63.86	102.00‡		14.00	11.20
Seattle, Wash.	82.06	126.40‡		19.00	15.20
St. Louis, Mo.	21.14	28.20*	28.20†	5.25	4.20
Washington, D. C.	33.50	44.70*	44.70†	8.00	6.40
Montreal, Canada	52.90		74.90†	12.25	9.80
Halifax, N. S.	69.30		108.65†	16.75	13.40
Ottawa, Canada	52.97		74.45†	12.75	10.20
Quebec, Canada	58.45		85.05†	13.50	10.80
Toronto, Canada	43.30		59.15†	11.75	9.40
Vancouver, B. C.	82.06	126.40‡		19.00	15.20

* 15 day limit, on sale daily
† 18 day limit, on sale winter months 1935–36 (beginning October 1)
** 10 day limit, on sale daily
‡ All Year Tourist, on sale daily
§ Pullman to Chicago

TRAIN SCHEDULES FROM PRINCIPAL CITIES

From Eastern Seaboard Cities Concentrating at New York, Philadelphia, and Washington

SPECIAL PULLMANS

Blue Train	*Red Train*
Leaves Saturday, October 17, and arrives New Orleans Monday the 19th	Leaves Sunday, October 18, and arrives New Orleans Tuesday the 20th

Lv. Boston — New Haven RR . . . . 4:00 p.m.
Ar. New York—Penna. RR Station . . . . 9:15 p.m.

Lv. New York — Penna. RR . . . . 9:50 p.m.
Lv. Newark . . . . .10:07 p.m.
Lv. Trenton . . . . .10:58 p.m.
Lv. Philadelphia — (30th St. Station) . . . . . . .11:42 p.m.
Lv. Baltimore . . . . 1:27 a.m.
Lv. Washington—So. Railway . . . . 3:00 a.m.
Lv. Greensboro . . . . 9:45 a.m.
Lv. Atlanta — West Point Route . . . . 6:00 p.m.
Lv. Montgomery—L. & N. Railroad . . . . .10:55 p.m.
Ar. **New Orleans** . . . . . . 7:45 a.m.

Delegates desiring to do so may leave New York 2:30 p.m., Philadelphia 4:09 p.m. and Washington 7:00 p.m., daily, and arrive New Orleans 9:30 o'clock next night.

From Buffalo, Cleveland, Pittsburgh, Detroit, Columbus, etc., concentrating at Cincinnati

Saturday, October 17	Sunday, October 18

Lv. Buffalo—N. Y. C. RR. 11:57 p.m.
Ar. Cincinnati . . . . 8:40 a.m.

Lv. Cleveland — Big Four Route . . . . .12:15 a.m.
Ar. Cincinnati . . . . 7:15 a.m.

Lv. Pittsburgh — Penna. RR . . . . .12:15 a.m.
Ar. Cincinnati . . . . 7:15 a.m.

Lv. Detroit—MC-Big Four Route . . . . .11:45 p.m.
Lv. Toledo . . . . 1:40 a.m.
Ar. Cincinnati . . . . 7:20 a.m.

Lv. Columbus — Penna. RR . . . . 5:18 a.m.
Ar. Cincinnati . . . . 8:15 a.m.

Sunday, October 18	Monday, October 19

Lv. **Cincinnati**—L. & N. RR (The Pan-American) . . . . .10:00 a.m.
Lv. Louisville . . . . .12:22 p.m.
Lv. Nashville . . . . 4:45 p.m.
Lv. Birmingham . . . . 9:25 p.m.

Monday, October 19	Tuesday, October 20

Ar. **New Orleans**—L. & N. RR . . . . 7:55 a.m.

Special A.P.H.A. sleeping cars will start from Cincinnati and other cities where sufficient number of persons leave in a group.

From Chicago and St. Louis For Members from Northwestern and Midwestern Points

Sunday October 18	Monday, October 19

Lv. Chicago—Ill. Cent. RR 9:00 a.m.

Lv. St. Louis . . . . 1:00 p.m.

Lv. Memphis . . . . .10:45 p.m.

Monday, October 19	Tuesday, October 20

Ar. **New Orleans**. . . . . 9:15 a.m.

Special sleeping cars will be operated from Chicago and St. Louis.

Notify the Association Office at Once if You Wish to Ride American Public Health Association Special Trains to New Orleans

NEW ORLEANS HOTELS

		Single		Double		
Hotels	*Room Capacity*	*Without Bath*	*With Bath*	*Without Bath*	*With Bath*	*Apartments*
Bienville	120	$2.00	$2.50–$3.00	$3.00	$3.50–$6.00	
De Sota	100	1.50	2.50– 3.00	2.50	3.00– 6.00	$6.00–$12.00
Jung	650	....	2.50– 4.00	....	3.50– 6.00	
LaSalle	...	1.50– 2.00	2.00– 2.50	2.50– 5.00	3.00– 5.00	5.00– 7.00
Monteleone	600	1.50– 2.00	2.50– 4.00	2.50	3.50– 6.00	
New Orleans	275	....	2.50– 3.50	....	3.50– 5.00	
Pontchartrain	200 (80 apts.)					4.00– 10.00
Roosevelt	...	....	3.00– 5.00	....	4.00– 8.00	10.00
St. Charles	...	....	2.50– 5.00	....	3.50– 8.00	8.00– 20.00
Orleans	50	1.50	2.00– 2.50	2.00– 2.50	2.50– 3.00	

..........*(Cut off on this line and mail to the hotel of your choice)*..........

HOTEL RESERVATION BLANK FOR NEW ORLEANS MEETING

AMERICAN PUBLIC HEALTH ASSOCIATION

OCTOBER 20–23, 1936

To ....
(Name of Hotel)

Please reserve for me .... rooms for .... persons for the A.P.H.A. Meeting.

Single room .... Double room ....

Maximum rate per day for room $.......... Minimum rate per day for room $..........

I expect to arrive .... If date of arrival is changed I will notify you at least 24 hours in advance.

Please acknowledge this reservation.

Name ....

Street address ....

City .... State ....

POST-CONVENTION TOUR TO FLORIDA AND CUBA

The Association will sponsor an 8-day, all expense, conducted tour after the Annual Meeting by train, motor, and steamer through Florida to Cuba. The trip will provide enjoyment, interest, and satisfaction in large measure but it is planned definitely for more than pleasure. It may be regarded as an official tour of inspection of Florida and Cuban public health work.

Expenses have been kept to a minimum through the generous hospitality of our hosts in Florida and Havana. Dr. W. A. McPhaul, State Health Officer of Florida, is the Chairman of the Committee on Arrangements in his state. His committee is composed of the health officers and civic authorities of the communities included in the itinerary. Dr. J. R. McEachern of Tampa promises a surprise evening, taking full advantage of that city's unusual entertainment facilities. Orlando is planning a reception, dance, and buffet supper. Dr. George N. MacDonell, Health Officer of Miami, on behalf of Miami and Miami Beach sends a suggestion for a day's activities which even include a dip in the ocean on famous Miami Beach.

Dr. Domingo Ramos, Director of Sanitation, acting for the Cuban Government, proposes the following schedule for the two days in Havana:

October 28, 1936

9:00 A.M.	Inspection Trip. Ministry of Health and Welfare, Finlay Institute, Hospitals and Clinics.
1:00 P.M.	Luncheon. Havana Yacht Club.
3:00 P.M.	Sight-seeing in Marianao and Countryside.
5:00 P.M.	Tea at Havana Country Club.

October 29, 1936

11:00 A.M.	Scientific Session. Hotel Nacional.
1:00 P.M.	Luncheon at National Hotel.
3:00 P.M.	Free for sight-seeing.

This is the barest outline of what the delegate may expect. A detailed itinerary, with costs and travel information, has been mailed to every member of the Association. Though it occupies 24 pages, it still does not include all the things planned for the recreation and education of the post-convention tour group.

Members of the Association, their families and friends are invited to take the trip. *Reservations should be made at once.* Additional copies of the itinerary may be obtained from the Association office.

VITAMINS IN CANNED FOODS

III. VITAMIN A

• The most characteristic evidence of severe human vitamin A deficiency, and one which is increasingly rare in this country, is xerophthalmia. Night-blindness, one of the manifestations that usually precedes xerophthalmia, has been recognized as a deficiency disease since the time of Hippocrates who described the disease, and its cure by eating liver. Infrequent reports of this disorder, however, still appear in the American literature. Most if not all of the symptoms accompanying a deficiency of vitamin A are thought to be the result of an impairment of the epithelial tissue (1). In this connection, a new method for the quantitative determination of this vitamin is based on the keratinization of germinal epithelia (2).

That vitamin A exerts an influence on the growth of human infants and children is also generally accepted.

As early as 1919, a relationship between vitamin A in plant foods and plant pigments was postulated. Research since that date has indicated that beta-carotene and some related compounds may be considered as provitamin A (3).

The vitamin A potency of fruits and vegetables is apparently due to their carotene content, since vitamin A as such has never been found in plant tissue. Ingested carotene is believed to be converted into vitamin A by enzyme action in the liver of the animal (4), in which organ the vitamin is stored.

Vitamin A in the form of carotene may be present in yellow, green or red pigmented fruits and vegetables—in the two latter cases, the yellow color of carotene being masked by other pigments present. Color alone, therefore, is not always a reliable index of potential vitamin A potency.

Both vitamin A and carotene are relatively stable to heat but are subject to destruction by oxidation. However, foods of both animal and plant origin, when canned by modern methods, have been found to retain their vitamin A potencies in high degree (5).

In fact, in some instances, practically no loss of vitamin A potency can be detected by formal bio-assays (6).

Commercially canned foods, therefore, may be used with the knowledge that they will contribute to the American dietary amounts of vitamin A entirely consistent with those contained in the raw materials from which they were prepared.

AMERICAN CAN COMPANY

230 Park Avenue, New York City

(1) 1927. J. Exp. Med., *46*, 699
(2) 1935. J. Nutrition, *9*, 735
(3) 1929. Biochem. J., 23, 803
(4) 1931. J. Biol. Chem., *94*, 185
(5) a. 1933. J. Am. Diet. Assoc., *9*, 295
b. 1931. J. Nutrition, *4*, 267
c. 1935. Am. J. Pub. Health, *25*, 1340
(6) a. 1925. Ind. Eng. Chem., *17*, 69
b. 1926. Ind. Eng. Chem., *18*, 85

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And *The Nation's Health*

Volume 26 — October, 1936 — Number 10

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Sixty-fifth Annual Meeting, New Orleans, La., October 20-23, 1936

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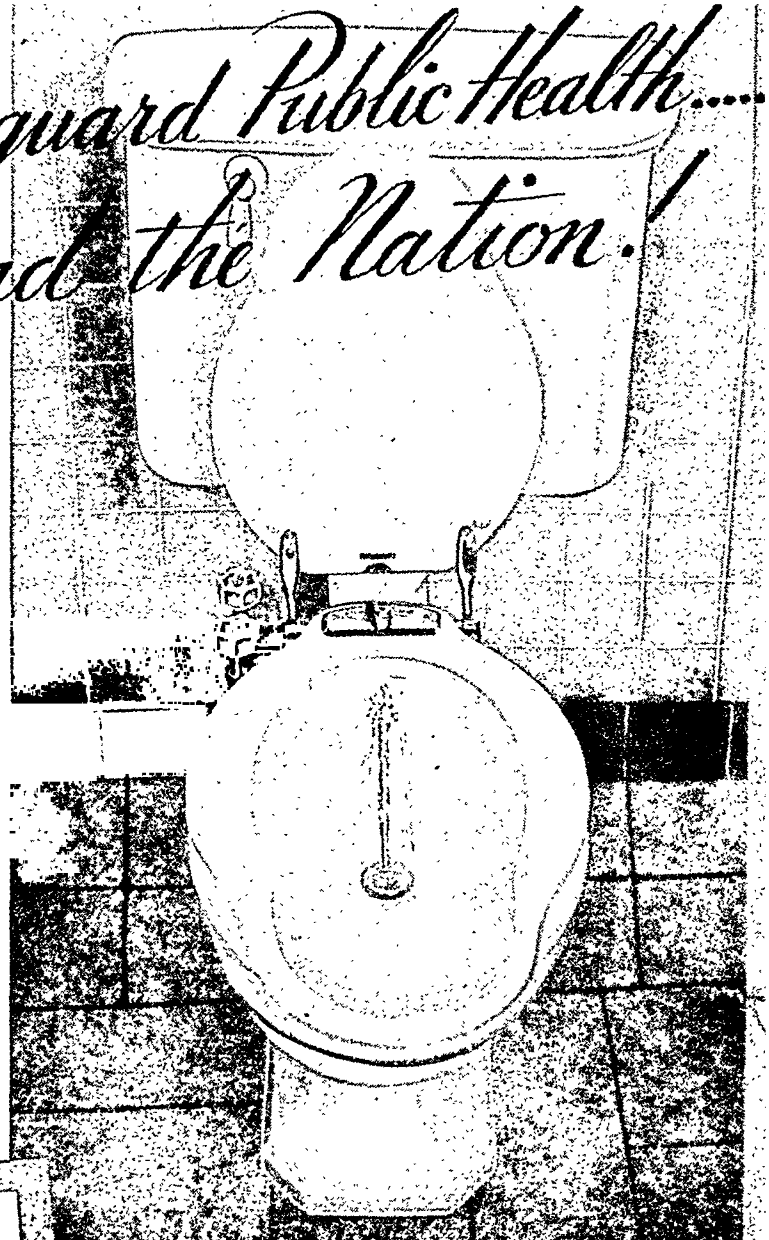

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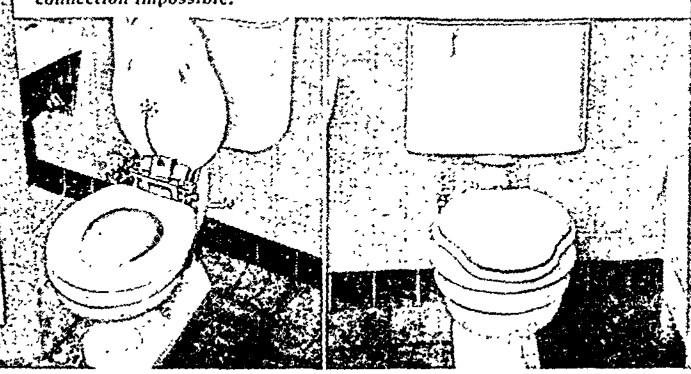

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Official Monthly Publication of the American Public Health Association

Volume 26 October, 1936 Number 10

CONTENTS

Continued on page vi

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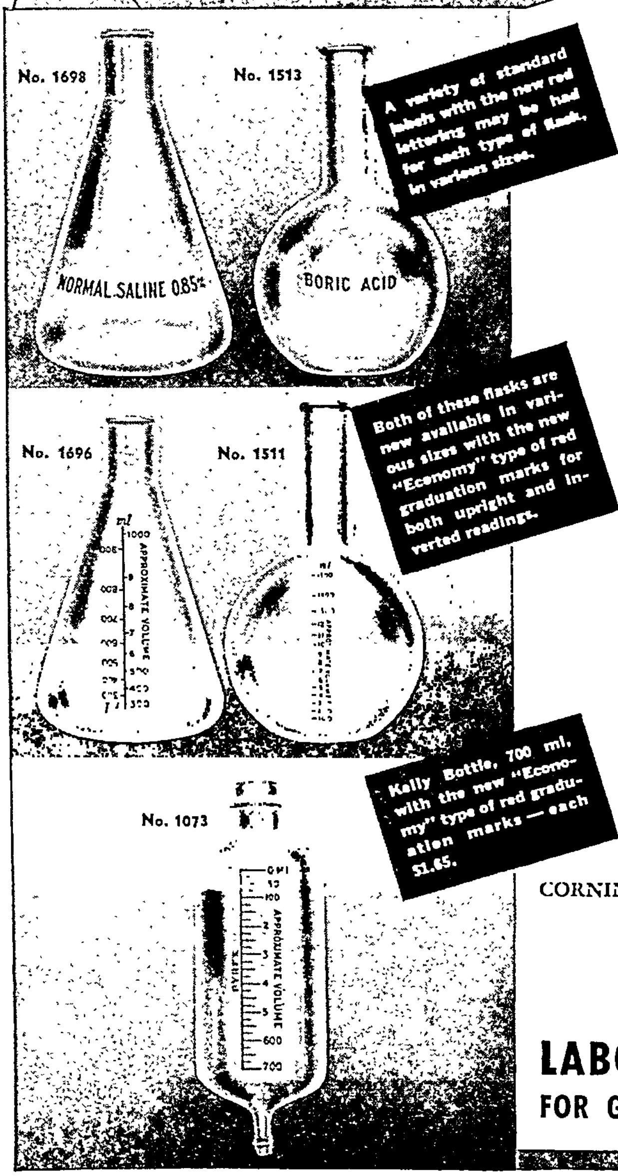

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Continued on page viii

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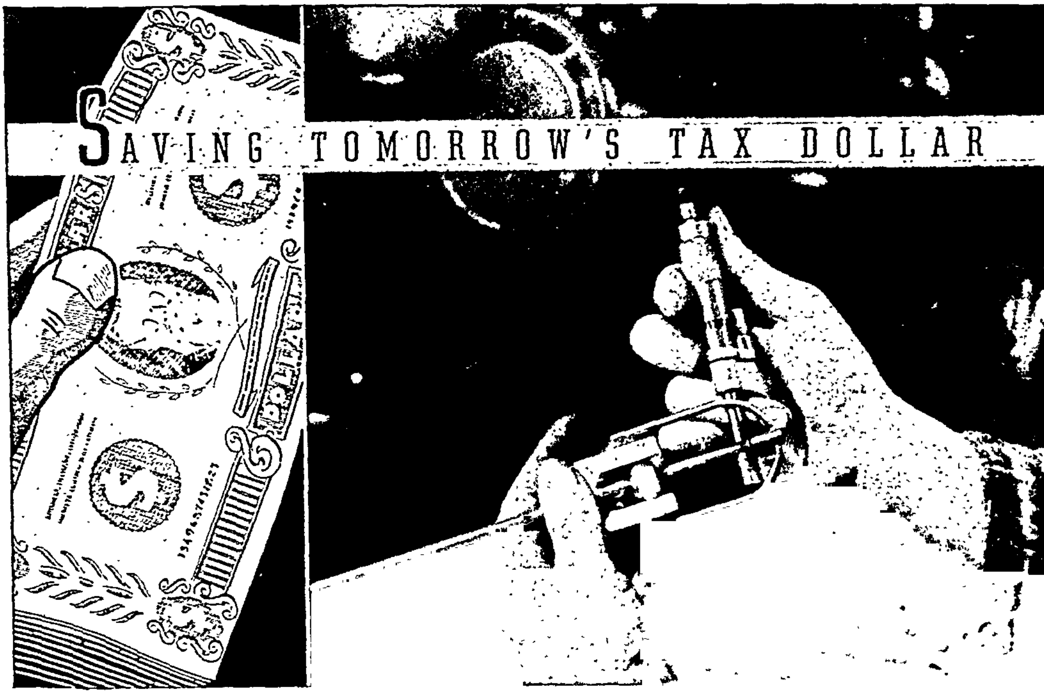
Contents—Continued PAGE

INDEX TO ADVERTISERS

MEETINGS OF AFFILIATED SOCIETIES

and A. P. H. A. Branches

Society	*Secretary*	*Place and Time of Annual Meeting*
Connecticut Public Health Assn.	Ira V. Hiscock	May, 1937
Florida Public Health Association	S. G. Thompson, D.P.H.	Tampa, Dec. 7-9, 1936
Georgia Public Health Association	M. E. Winchester, M.D.	To be announced
Massachusetts Public Health Assn.	G. Donald Buckner, S.B.	Boston, Jan. 28, 1937
Michigan Public Health Association	Marjorie Delavan	Lansing, Nov. 11-13, 1936
Missouri Public Health Association	Dr. C. F. Adams	Columbia, Oct. 1-3, 1936
New Mexico Public Health Assn.	Paul S. Fox	To be announced
Northern California Public Health Association	Dr. I. O. Church	To be announced
Ohio Federation of Public Health Officials	W. D. Bishop, M.D.	Columbus, Nov., 1936
Pennsylvania Public Health Assn.	J. M. J. Raunick, M.D.	Harrisburg, Pa., Sept. 17, 1936
South Carolina Public Health Assn.	Laura Blackburn	To be announced
Southern California Public Health Association	Charles W. Arthur	To be announced
Texas Public Health Association	Lewis Bracy	Kilgore, Oct. 14-16, 1936
Virginia Public Health Association	B. B. Bagby, M.D., Pres.	To be announced
West Virginia Public Health Assn.	John Thames, M.D.	Wheeling, Oct. 12-14, 1936
Southern Branch, American Public Health Association	G. Foard McGinnes, M.D.	Baltimore, Md., November 17, 18, 1936
Western Branch, American Public Health Association (joint meeting with Canadian Public Health Association)	William P. Shepard, M.D.	Phoenix, Ariz., April, 1937



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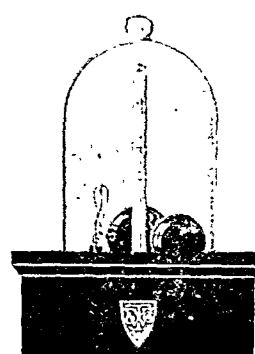

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American Journal of Public Health
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Volume 26 October, 1936 Number 10

The Sylvatic Plague Committee*

KARL F. MEYER, PH.D., M.D., F.A.P.H.A.

Professor of Bacteriology, Director G. W. Hooper Foundation, University of California, San Francisco, Calif.; Chairman, Sylvatic Plague Committee

AT the sixth annual meeting at Helena, Mont., in July, 1935, the Western Branch of the American Public Health Association authorized the President to appoint a special Committee on Sylvatic Plague. The original appointments of 19 representatives from the States of Oregon, Washington, Nevada, Montana, Wyoming, Idaho, and California, the U. S. Public Health Service, U. S. Forest Service, and U. S. Biological Survey were supplemented by additional representatives to a total of 22. On October 7, 1935, 7 members of the committee, residents in San Francisco or vicinity, held a preliminary meeting to discuss a series of topics and questions which had been submitted to the chairman by the health officers of the western states or their representatives. In order that the members of the committee be informed relative to the purpose and duties, the status of sylvatic plague was outlined as follows:

1. *Historical*—In 1928 R. Jorge, in an exceedingly valuable monograph " Rongeurs et Puce " (Masson et Cie, page 36) summarized the detailed inquiries made by the Office International d'Hygiene Publique. He pointed out that owing to the widespread liability of rodents to *P. pestis* infection, plague not only occurs in epizoötic form among rats but also among wild rodents. Thus two types of epizoötics give rise to correspondingly different human epidemics. The great reservoir among wild rodents (72 species definitely known to suffer from spontaneous plague) slowly invading from colony to colony invariably independent of man's lines of communication and, as a rule, located in deserts or steppe-like countries is epidemiologically rural plague and so different from rat plague that Jorge proposed for this type of epizoötic the designation " peste selvatique " (" Selvatic plague "). In a more recent paper [1], he discusses the subject in detail and uses again the name " Peste selvatique." Although C. O. Stallybrass [2] and Wu Lien-Teh [3] accepted the above spelling, further etymologic inquiries left no doubt that the English word sylvatic in reference to plants or animals means " growing or running wild," and that therefore the correct title " Sylvatic

* Read before the Western Branch, American Public Health Association, at the Seventh Annual Meeting in Vancouver, B. C., June 26, 1936.

Plague," as adopted by the *Journal of the American Medical Association* [4] should be used.

The introduction of this new terminology has not met with unanimous approval by the health officers. Some are of the opinion that plague is plague and from the standpoint of public health it makes little difference whether it is in rats or in wild rodents. In fact, they argue further that it is much better to let the public be made aware of the existence of plague within the boundaries of a county or state. By using a new term, the effectiveness of the mysterious terror creating, fearful unknown which adheres to the word plague, is lost, and the public is lulled into a feeling of perfect safety and financial inertia. Obviously, these arguments cannot influence the investigators. A brief consideration of the facts to be presented leaves no doubt that the type of plague now operating in the United States is different zoölogically and geographically from the plague of the Middle Ages or the "Black Death." It is not the work of rats but of wild rodents; it rages not in the inhabited parts of the country but in the sparsely inhabited or uninhabited, and as an epizoötic which is very poorly understood. By comparison with rat plague which as history has shown rises and falls within a century and finally flickers out, wild rodent-sylvatic plague is everlasting and permanent. With its sequelae so forcibly shown in the Manchurian pneumonic plague outbreaks of 1910–1911 and 1920–1921, and in Oakland, Calif., 1919, sylvatic plague unfolds a number of possibilities and deserves special scientific consideration.

That rodents other than rats may transmit plague to man was first recognized by Reidenko and reported in 1901 [5] but it was reserved for W. B. Wherry, and in particular G. W. McCoy, to prove conclusively in 1908 that the ground squirrel (*Citellus beecheyi*) is not an infrequent source of human plague infection. It is not unlikely that these American studies materially influenced the inquiries which were made into the pneumonic plague catastrophes in Manchuria in 1910–1911. There is no doubt that they guided the carefully planned and brilliantly executed researches of J. A. Mitchell, J. H. H. Pirie and A. Ingram on plague in South Africa. It is painful to note that while English, Russians, Chinese, and South Americans contributed greatly to the elucidation of the sylvatic plague problems in the various foci discovered on 3 continents, American workers, following the departure of McCoy from California, were forced to stand by and devote their energies and inadequate funds to suppressive measures which, in the light of recent developments, are illusory and empirical.

As a guide to future investigations, it is important that the present-day knowledge concerning plague of the wild rodents be made more widely available. This is one of the functions of the Committee on Sylvatic Plague.

2. *Comparative Characteristics of Sylvatic Plague*—It is well known that the pandemic distribution of plague is maintained by a few species of domesticated rats. Sylvatic plague, however, remains localized, since in each region a particular fauna maintains the infective agent. As a rule, one principal species belonging to the family of sciuridae and gerbillinae living in subterranean colonies, in families or singly presides over the exchanges of the plague bacillus, while a group of small rodents (varieties of muridae perhaps jaculidae) act as pestiferous, complementary and intermediate hosts by supporting the epidemicity of the animal plague. The diverse perigrinations of these animals bring the disease agent in the vicinity of human habitations. This complex interplay has received

careful analysis through the time consuming and detailed studies of Nikanoroff in Southeast Russia. The pestigenic rodents are principally herbivorous and the infection, as a rule, is spread by flea carriage. However, carnivorous, cannibalistic habits may greatly favor the spread of the disease leading, as a rule, to a dying down of the epizoötic without providing for its persistence. Concerning the rise and fall (3 to 4 years) or the periodic cycles (10 to 11 years) of sylvatic plague in a given area, Elton (1925) concludes that plague may act as a population regulator which, in its periodic spacings, may be controlled by sun spots, while the short period fluctuations may be influenced by the climate. It remains to be seen whether this theory applies to any one of the principal sylvatic plague foci.

The pestiferous fleas vary according to the species of wild rodents; each group has its own hordes of pulicidae. They disseminate *P. pestis* among the rodents, and when the opportunity arises they attack man with ease. The mechanism of transmission as established by Bacot and Martin for the classical plague fleas has been confirmed by Golov and Joff for the *Ceratophyllus tesquorum* of the suslik.* Contrary to previous experiments showing in South Africa a flea infection carriage for from 3 to 4 months, the observations in Southeastern Russian foci have proved that some of the fleas may carry the infection for 206 days and starve for nearly 196 days. As a rule, these insects attach themselves only while feeding. Since they remain in the nests, it is doubtless difficult to secure a true picture of the ectoparasitic fauna (flea index) by merely counting the fleas found on the wild rodents. Both the fleas captured on the animals and those gathered in the burrows must be counted in order to secure a picture of the vectors to which the rodents are exposed.

The anatomical markings of the rodents involved in sylvatic plague are characterized by lesions in the lymph-nodes and striking tendency to latent infections without gross pathology. Secondary or even primary pulmonary localization is much more common than in the rats. This form of localization may be chronic. Involvements of the lymph-nodes adjacent to the upper and lower gastrointestinal tube as a sequel of cannibalism are by no means infrequent. The diversity of the pathologic lesions in the sylvatic plague animals is no doubt influenced by the variable susceptibility of the rodents during and after hibernation, and possibly the infectiousness of *P. pestis* in the closed lesions. There is always the possibility that human plague due to sylvatic sources is primarily bubonic and septicemic, and may be followed by secondary pulmonary localization (this tendency first clearly recognized in Manchuria has also been stressed by McCoy). The handling of cadavers, furs of the rodents, or direct contact may be responsible for the peculiar involvement of the lung by inhalation. In this respect, the mode and pathway of infection is in part reflected by the laboratory accidents which, as a rule, manifest themselves as plague pneumonias.

3. The renewed interest in sylvatic plague in California and in the western states may be attributed to observations made early in 1934. An increased mortality among the ground squirrels (*Citellus beecheyi*) on the ranches lying north and east of Bakersfield was recognized as plague. Thus for the first time in the history of plague in California, the disease had migrated from the coast counties and, without leaving markings concerning its wanderings, appeared in the foothills of the Sierra Nevadas. It

* Spermophile, or ground squirrel of Northeastern Europe and Northwestern Asia.

is needless to emphasize that the development of these new foci despite well organized suppressive measures created justifiable concern. The many discussions incident to these unforeseen developments acquainted the Agricultural Commissioners, the U. S. Forestry Service, and the Biological Service with the problems involved. Representatives of these agencies engaged in the distribution of poison on government lands in Modoc County (Northeastern County of California) observed dying and dead squirrels on ranches north and east of Alturas.

Surveys made during the summer proved plague in 5.1 per cent of the shot or dead Oregon ground squirrels (*Citellus oregonus* [Merriam]) collected in an area of 65,000 acres. Inquiries disclosed the interesting fact that at periodic intervals over many years, epidemics have appeared among the squirrels of Modoc County. Since tularemia is by no means uncommon in this particular part of California, it was quite generally believed that the rodent epizoötics were caused by *Bacterium tularense.* Shortly after the discovery of sylvatic plague in Northern California, reports were received relative to the bacteriological confirmation of a case of human plague at Lakeview, Ore. (May 16, 1934). The history of this case as presented by William Levin [6] is as follows:

C. S., aged 30, sheepherder, was employed on a desert near Lakeview. There were a number of tick bites on his right ankle, which (probably?) were the source of his infection. The onset of the symptoms was on May 19; the temperature was 105°, pulse 110, leukocytes 14,000. There was tenderness and a swelling in the right groin the size of an egg. There was slight improvement the next day. On the following day the patient felt strange; there was noticed a dusky livid hue over his body. This became more pronounced and death occurred on May 21 from an overwhelming toxemia. The patient was very dark at death.

Extensive surveys clearly showed that the Southern Oregonian focus responsible for the infection in the sheepherder was connected with the California areas, and that the invasion occurred from the north and is in no way connected with the principal areas south of the Sacramento River.

Aside from the fatal human case of plague in Oregon, a very interesting observation was made in California. In June, 1934, a 10 year old school boy from Porterville visited a ranch on which plague infected squirrels had been found, and contracted bubonic plague (right axillary bubo). He recovered from his local process, but died on the 125th day after the onset of his illness from chronic plague meningitis. This observation proves the occurrence of chronic latent plague in man.

In April, 1935, shortly after the first squirrels emerged from hibernation, the survey activities were renewed in Modoc County. New areas were recognized. Plague was proved in 107 Oregon squirrels (7.1 per cent, 1,492 shot squirrels), 4 wood rats (*Neotoma*) and 1 white footed field mouse (*Peromyscus*). Ranchers also reported squirrel mortality on the valley meadows of Northern Lassen County which orographically connects the sylvatic plague foci of Modoc County. An examination of 198 squirrels yielded 1.5 per cent infected with *P. pestis.* In the course of these investigations, latent, inapparent plague was discovered by guinea pig inoculations of lymph-nodes removed from Oregon squirrels with no gross anatomical markings of disease.

Simultaneously, the U. S. Public Health Service proved plague infection in the Oregon and Columbia squirrels found dead or shot in Lake, Grant, and Wallowa Counties, Ore. Of greatest concern and importance was doubtless the demonstration of plague in a ground squirrel (*Citellus richardsonii*) near

Dillon, Beaverhead County, Mont. Despite the extensive reservoir of diseased rodents, no human cases were reported during the year 1935.

In this connection, it appears advisable to place on record the observations made in 1936 to date, June, 1936, although this information was obviously not presented to the committee in October, 1935.

During March, 1936, the Agricultural Commissioner of Ventura County accidentally noted a sick *Citellus beecheyi* which on autopsy presented the lesions of subacute plague. The rodent was found adjacent to an old sylvatic plague focus. Far more alarming is the recognition of a case of pestis minor (left axillary lymph-node) in a veterinarian who practised in Sonoma County, north of San Francisco Bay. Despite detailed investigations, the source of this infection has not as yet been established. Equally significant is the demonstration of plague infected fleas collected from *Citellus armatus* in Elko County, Nevada, by Dr. C. R. Eskey of the U. S. Public Health Service in May, 1936. Several hundred squirrels had been examined for plague in this region but none had been found with suspicious lesions.

The new procedure to locate plague infection among squirrels by collecting the fleas present on the rodents and by injecting an emulsion of the insects into guinea pigs was originally suggested by Dr. Eskey to the committee. The method is exceedingly promising since the Hooper Foundation has succeeded equally in demonstrating plague infected fleas in Ventura County in the Fandango Valley, the Modoc National Forest, and Pine Creek (Modoc County). In the 4 instances, the insects had been collected from rodents without suspicious plague lesions. Active sylvatic plague had not been observed in Fandango Valley since the fall of 1934. Quite recently septicemic and localizing subacute plague has again been proved in the squirrels of Northern Lassen County and new areas in Modoc and Santa Cruz Counties. A second case of pestis minor in an 11 year old boy has been diagnosed in the southern sector of Monterey County.

Dr. C. R. Eskey has demonstrated *P. pestis* in fleas and squirrels (*Citellus armatus*) forwarded by the U. S. Public Health Service and the State of Idaho mobile laboratories, on two ranches in Bonneville County, Ida. A case of human plague has been recognized in Southwestern Utah.

Following the presentation of the facts, the group discussed and answered a number of questions which had been submitted for consideration by the committee. Since these deliberations brought to light several pertinent points of general interest, it is deemed advisable to detail the questions and answers.

(a) *What is the scope of the work done or expected to be done by the federal agencies in connection with sylvatic plague?*

The U. S. Public Health Service has been directing its efforts and will continue to determine the presence of plague infection in field rodents in the 8 western states, with more limited application to California due to the extensive survey activities conducted by the State Department of Public Health.

Under the guidance of Dr. C. R. Eskey, the plague laboratory at San Francisco will make field surveys, and examine specimens of rodents received from county agents, state veterinarians, and other officials. Incidental to the determination of sylvatic plague areas, special studies relative to the insect vectors and ectoparasites will be carried out. It is intended that monthly reports of the number of rodents examined will be submitted to the state health officers. Special reports will be forwarded immediately in the event of

plague infected rodents being found and recognized.

The U. S. Biological Survey will coöperate with the Agricultural Regulatory and Service Agencies in the educational and control work in the several states and, in the case of the federally owned and controlled lands, it will operate directly in coöperation with the U. S. Forest Service. The U. S. Forest Service, wherever its interests are involved, will seek the assistance of the U. S. Biological Survey in an effort to eliminate diseased rodents from the National Forest areas.

(b) *What should be expected of the state health departments in the control of sylvatic plague?*

It is fully recognized that each state must ultimately recognize and appreciate its own responsibility with respect to sylvatic plague in the field rodent population, and should make every effort to coöperate with the federal agencies to determine the extent and distribution of the disease. In particular, it is desirable that provisions be made for a state laboratory to care for the determinations of plague within its jurisdiction. It is generally agreed that the control work should be centralized with the established agencies entrusted with rodent suppressive measures. In all of the western states, with the exception of California, rodent control is carried out in coöperation with the U. S. Biological Survey. In a number of the states, the allotments for control are directed to the Biological Survey, while in others a local agency supported by state funds operates in close coöperation with the Biological Survey. However, it is recalled that the activities of the Biological Survey are limited by the federal funds allotted, although it stands ready to coöperate with any existing agency or any agency which may be established.

In California the following system of coöperation has been developed: The State Department of Public Health, through its 5 survey crews, determines the location of the sylvatic plague foci and reports them to the Agricultural Regulatory Agencies consisting of the State Department of Agriculture and the County Agricultural Commissioners. The State Legislature makes direct allocation of funds to the State Department of Agriculture for rodent elimination on plague areas. These funds are utilized on a three-way coöperative basis whereby the state, county, and land owner participate. This arrangement insures an equitable distribution of the burden of the costs, and impresses the land owner with the benefits derived from ground squirrel and rodent elimination on his property.

(c) *Should the activities in any state be concentrated in one department, such as the state health department? or should they be divided among several departments, such as the departments of health or agriculture, sanitary live stock department, veterinary department, extension service, etc.?*

In the event sylvatic plague has been demonstrated within the boundaries of a state, it is imperative that a committee, called by the state health officers, define the duties of the various agencies temporarily enthusiastic in participating in the control of a newly discovered disease. Experience has shown that the health department in coöperation with the U. S. Public Health Service is best qualified to determine and diagnose the existence of plague. In turn, the department reports to the properly constituted agencies, either a special commission, the Extension Service, the U. S. Biological Survey of any other agency.

When plague has been found, the control of the disease in its various ramifications is a joint responsibility of the state and federal governments. However, it is fully recognized that the state in whose boundaries sylvatic plague has

been proved will assume responsibility and participate to the fullest extent by furnishing funds both for disease detection and control. Each state should have its own plague laboratory, properly equipped and staffed with trained personnel. Furthermore, it will be necessary to provide definite standards for systematic follow-up work, and intra- and interstate reporting not only of the sylvatic foci discovered but also with respect to the results secured in the course of the suppressive measures.

It is generally recognized that the agencies entrusted with the control of the economic damage directly attributable to rodent pests must concentrate their efforts on the elimination of diseased rodents and their vectors immediately following the recognition of plague. This principle assumes the position of primary and major importance, and every other activity must be subordinated and coördinated with the plague program.

In addition to the discussion of the above questions, the group considered the methods which may be used to obtain information concerning the location of sick, dying, or dead rodents; procedures of shipping specimens suspected of plague; publicity; institutional course on sylvatic plague in San Francisco; appointment of an executive committee; and future meetings. The committee was circularized with a questionnaire relative to the items mentioned.

INSTRUCTIONAL SHORT COURSE ON SYLVATIC PLAGUE

Under the auspices of the committee, an instructional short course was held at San Francisco and vicinity. On April 27 and 28, 1936, lectures and demonstrations were given in the laboratories and lecture rooms of the Department of Medical Bacteriology, University of California, Medical Center, and the U. S. Public Health Service Plague Laboratory, Marine Hospital, San Francisco. There were in attendance 125 representatives from Idaho, Montana, Oregon, Washington, and California. Those present were furnished a detailed mimeographed syllabus of the lecture and laboratory demonstrations.

Splendid demonstrations concerning the equipment and technic employed in the field study of plague were given by E. T. Ross, Chief Sanitary Inspector, California State Department of Public Health and his staff near Brentwood, Contra Costa County, on April 29, 1936. Similarly, on April 30, 1936, E. E. Horn and staff members of the U. S. Biological Survey and California State Department of Agriculture gave field instruction in the methods used in rodent control.

Careful planning assured a perfect organization and an uneventful execution of the unique program which was greatly appreciated by everyone in attendance. Judging from reports received, the course must be considered the major contribution of the committee to the organization of an effective control program against sylvatic plague in the western states. Plans are being made to repeat this type of instruction when needed.

During the short course, the chairman called a general meeting. He outlined the long view of the problem and sketched the duties of the committee as follows:

1. To act as an open forum for the discussion of all phases of the problem connected with sylvatic plague research and suppressive measures.
2. To coördinate the studies and control activities in the western states.
3. To advise and guide the publicity and educational program.
4. To organize instructional facilities, and to provide scientific aid in connection with the identification of rodent diseases and insect vectors.
5. To inform at frequent intervals the official agencies of the states concerning the trends of sylvatic plague.

6. To aid the agencies involved in plague work in securing adequate funds for the maintenance of laboratory and field investigative facilities as well as proper rodent control measures.

Dr. R. R. Parker, Director of the Rocky Mountain Laboratory, U. S. Public Health Service, at Hamilton, Mont., presented a carefully prepared and exhaustive research program on sylvatic plague embodying 15 major points. The headings are herewith recorded in order to indicate the broad scope of the investigative field involved.

1. Study of fleas of the native fauna
2. Studies of other parasites of the native fauna
3. Study of the native fauna (identification and ecology of species)
4. Ecology of the burrows and nests of the native fauna (during active season and during estivation and hibernation)
5. Susceptibility to plague of the native fauna (particularly rodents at first)
6. Laboratory study of the disease in susceptible native animals (course, types of disease and immunity)
7. Flea culture
8. Determination of what species of native fleas are active or are capable of acting as transmitting agents of plague
9. Determination of whether any parasites other than fleas are acting or are capable of acting as plague transmitting agents, or as agents in the natural maintenance and perpetuation of the disease
10. Natural occurrence of plague in the native fauna and fleas (tests for inapparent infection, occurrence of immune animals of susceptible species and their significance)
11. Study of how sylvatic plague survives the winter
12. Study of means by which plague is spread
13. How plague is maintained in nature
14. Study of diseases of small animals other than plague and particularly those that simulate plague (The Hooper Foundation will act as the clearing center for problems of this sort.)
15. Observations relating to direct and indirect opportunities for contact between susceptible species of the native fauna and man

The committee fully appreciates that the effective suppressive measures can be planned only when the scientific investigations have furnished the answers to the many unknown factors doubtless operating on a large scale. Obviously, a research program of the scope outlined must by necessity be divided among many properly qualified workers. Field investigations are increasingly more important than laboratory studies. The University of California group has perfected plans to study certain phases grouped under 1, 4, 5, 6, and 11.

Following the presentation of the report by Dr. Parker, the committee discussed in detail a number of important subjects, and by resolution adopted the following recommendations:

(A) The Sylvatic Plague Committee, desirous of the coöperation of Dr. M. A. Stewart, Assistant Professor of Entomology, University of California Branch at Davis, requested the chairman to communicate with Professor C. B. Hutchison, Dean of the College of Agriculture, in order to secure permission for the establishment of a central authority urgently needed for the identification of fleas collected from rodents. (This permission has been granted; Professor Stewart has accepted the invitation; and a circular detailing the methods to collect and ship fleas to the Central Flea Laboratory has been mailed to the members of the committee.)

(B) The Sylvatic Plague Committee will communicate with the state universities, colleges, and museums throughout the western states to devote attention to the investigations, and to record the distribution and ranges of rodent groups, birds, and mammals which may be incriminated or suspected of serving as carriers of diseases transmissible to man.

(C) By authority of the committee, the chairman was delegated to invite the U. S. Bureau of Biological Survey to place at the disposal of the members such data and information from their faunal studies, both complete and incomplete, as may be needed in the elucidation of certain phases of sylvatic plague.

(D) The committee authorized a well worded communication calling the attention of the officials in the western states to the proper function to be performed by the states and the financial needs relative thereto in respect to sylvatic plague; the communication to outline the relationships of the state hy-

gienic laboratories to the plague investigations now in progress.

(E) The committee endorses the proposal to address a circular letter to the directors of agricultural extensions and the directors of the several departments of agriculture in the western states requesting that the committee be advised relative to forthcoming meetings of county agents and farmers in order that representatives of the Plague Committee may be present to discuss the problems involved and to solicit coöperation in reporting epidemics among rodents. (The chairman has addressed a group of representatives from the various departments at Salt Lake City, Utah, May 16, 1936, at Seattle, June 29, and Portland, June 30, 1936.)

The chairman of the committee, in submitting the report and the resolutions to the Western Branch of the American Public Health Association for its approval, recommends the reappointment of the membership, executive committee and continuation of the entire committee as constituted.

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Plague Infection Discovered in Fleas and Lice Taken from Marmots in Montana and in a Marmot in Utah

A REPORT has been received, under date of August 10, 1936, from Surgeon C. R. Eskey, in charge of plague suppressive measures, San Francisco, Calif., that plague infection had been discovered in fleas and lice taken from ground hogs (marmots) which had been killed in Small Horn Canyon, Mont., about 12 miles southwest of Dillon, Beaverhead County. Following is Surgeon Eskey's report:

Plague has been determined in both fleas and lice taken from 7 ground hogs (marmots) shot at the head of Small Horn Canyon, about 12 miles southwest of Dillon, Beaverhead County, Mont., July 25, 1936, by employees of the Rocky Mountain Laboratory. One hundred and fifty-three fleas and 26 lice were collected in separate bottles and inoculated into guinea pigs, which died in 6 and 3 days, respectively. Secondary inoculations and cultures gave typical plague reactions.

These findings are of interest because they provide the first direct evidence that plague exists among marmots in America and demonstrate that the infection may be recovered from lice as well as fleas taken from these rodents. Fatal epizoötics have been noted among marmots in a number of localities in western states, but no infected animal has yet been found.

The foregoing report has been supplemented by later information (dated August 13) received from Surgeon Eskey in which he states that plague has been determined in a sick ground hog (marmot) killed July 31, 1936, in Indian Creek Canyon, 14 miles northeast of Beaver, Beaver County, Utah. This is believed to be the first plague infected marmot reported in the United States.—*Pub. Health Rep.* 51, 34:1059 (Aug. 21), 1936.

A Study of the Pollution of a Shellfish Producing Area*

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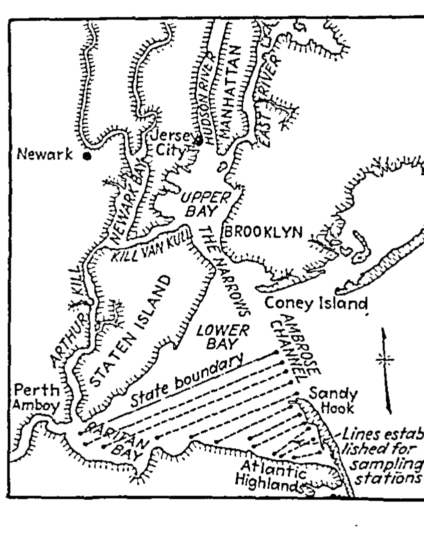
FOR many years Raritan Bay † has been a prolific producer of both hard and soft clams. Whether this variety of shellfish was harvested from this area years ago to the detriment of the public health I cannot now say but with our present knowledge concerning the relationship between contaminated shellfish and the incidence of certain diseases, it behooves present-day public health agencies to consider more carefully the sources of market shellfish.

EXISTING RESTRICTIONS

The health authorities of New York City recognized the danger in taking clams from the polluted waters of this large area as early as December, 1924, when they closed their markets to all shellfish from them except string clams marked " For cooking purposes only." New York State officials closed the New York portion of the bay for the taking of shellfish for marketing purposes in 1925, and in 1934 the New Jersey State Board of Health took similar action on certain shoreline areas, thereby restricting the taking of clams to those sections which in their opinion were satisfactory. All of these official actions reduced the clamming grounds in the bay to an area much smaller than was formerly available. This area is a good clam growing one which can support a large number of shellfishermen. In Highlands, New Jersey, the taking, shucking and packing of clams is one of the important industries today and the livelihood of many families is dependent upon activities incident to it. There is no inclination on the part of any public health officer whom I know to insist upon the closure or restriction of any shellfish area which does not merit such action. However, if there is any doubt concerning the quality of

RARITAN BAY IN RELATION TO OTHER PARTS OF THE NEW YORK METROPOLITAN DISTRICT AND THE AREA IN WHICH SAMPLING LINES WERE ESTABLISHED



* Presented at the Annual Meeting of the New Jersey Sewage Works Association at Trenton, N. J., March 19, 1935.

† Raritan Bay, as used in this paper, will be considered as those areas shown on U. S. Coast & Geodetic chart #369 as Raritan Bay, Sandy Hook Bay and Lower Bay.

an area, a decision must be made against the area and in favor of the public health. The only tenable position—one with which the shellfish industry as a whole will agree, I am sure—is that no chance should be taken when disease, suffering, and possibly the loss of lives are in one balance with the need for limiting or restricting a local industry in the other.

It was, apparently, with these considerations in mind that New York City through its Board of Health erected a barrier against clams from this bay by prohibiting their sale in that city. Inability to sell to New York City dealers presented a severe handicap to the shellfish industry along the New Jersey shore of Raritan Bay and warranted relief measures if they could be secured safely. This was the situation in the summer of 1935 when the desirability of this survey was first mentioned. After several conferences by the interested groups, New York City agreed to permit the sale of clams within city limits from those areas in Raritan Bay, N. J., found by the U. S. Public Health Service to be suitable for clam harvesting. Having secured such a fair decision, it remained only to ascertain by careful study what sections—if any—of these New Jersey waters were suitable for the removal of clams for direct sale to dealers.

FACTORS INCLUDED IN STUDY

The *Report of the Committee on Sanitary Control of the Shellfish Industry in the United States* drawn up and published in 1925 set forth a number of specific recommendations concerning the scope and enforcement of state regulations for the sanitary control of shellfish. One of the essential requirements was stated to be "that no shellfish should be offered for sale except such as have been taken from beds which, after careful and competent examination, are found to be free from any justifiable suspicion of contamination which is judged to be either dangerous or offensive." In discussing the provisions essential to fulfilling this requirement, the committee outlined briefly how and under what conditions an area should be approved. Its stipulations were as follows:

> . . . that before approval is given for the use of any area for the taking of oysters for market, the area should be carefully examined by competent and responsible officials.
>
> The examination of the area should always include a sanitary survey, which should be supplemented by bacteriological examinations of the water and shellfish wherever these may be necessary for competent judgment. Since it is essential that the examinations be made and interpreted only by persons having the necessary qualifications of technical education and experience, it is assumed that the purposes, methods, and limitations of sanitary surveys and bacteriological examinations will be understood and need be outlined only briefly here.
>
> The primary purpose of the sanitary survey is to estimate as accurately as possible the extent of actual or potential contamination of the waters in question with *human excreta*. A distinction must be made between such pollution and that from animal sources or from the soil, as a necessary basis for the interpretation of the results of bacteriological examinations.
>
> The survey should, therefore, take careful account of all the determinable factors affecting pollution; namely, the sources of actual or potential fecal contamination, with special reference to human excreta, considered in relation to methods and efficacy of artificial treatment of sewage and to the natural safeguards afforded by dilution in the receiving body of water and by natural purification, as influenced by temperature and by time intervals between contaminating sources and the shellfish beds, due regard being paid to the likelihood of contamination in coves and inlets from sources which would be insignificant in relation to a large and well mixed body of water. Careful consideration should also be given to the likelihood of dangerous contamination from boats, especially in small and shallow bodies of water and in the vicinity of main ship channels. Any discharge of excreta from oyster boats in the vicinity of shellfish beds should be rigidly prohibited.
>
> Although the information furnished by a survey of this kind is not exact in a quanti-

tative sense, it will be sufficient for forming a reliable judgment when the examination shows such pollution or risk of pollution as to render the area obviously unfit, or conversely, where it shows that there is no discoverable probability of dangerous contamination. Where the survey shows exposure to more or less constant but probably slight pollution with sewage from rather distant sources, or with surface drainage from populous unsewered territory, so that the safety of the area depends upon the protection afforded by dilution and natural purification, there is need of more exact quantitative information than is furnished by a sanitary inspection alone; and in such cases bacteriological examinations of the waters and shellfish are a necessary part of the study.

Undertaking an inspection such as outlined above consequently involved a study by competent personnel of actual and potential sources of contamination; the results to be summarized in a quantitative way and considered in relation to dilution, tides, currents, and time intervals. Such a study necessarily entailed the collection of both physical and bacteriological data.

In my elaboration of this particular study, I will discuss (a) the quantities of sewage reaching Raritan Bay and their probable effect on the New Jersey waters thereof; (b) the influence of natural factors such as winds and tidal currents; and (c) the bacteriological confirmation of tentative decisions reached from the examination of the physical data.

QUANTITIES OF SEWAGE DISCHARGED

Through the coöperation of the Department of Sanitation, City of New York, and the State Department of Health of New Jersey, I have been able to secure approximate figures on the quantities of sewage reaching Raritan Bay either directly or by way of tributary streams. In Table I these data are tabulated divided in two different ways; namely, on the basis of (1) treatment and (2) the receiving body of water. Obviously, these figures include only the discharges from territory lying within a reasonable distance of Raritan Bay.

In New York, treatment as shown in this table consists of fine screens with or without chlorination. In New Jersey, it involves combinations of the processes of sedimentation, oxidation, and chlorination, and in most cases is of higher character than treatment at any New York State outlet includes.

AVAILABLE DILUTING WATER

In the following discussion of available dilution, the treated and incompletely treated wastes will be ignored and only untreated sewage considered. The greatest volume of raw sewage finding its way into the bay through contributory streams comes from New York State and is approximately 858 m.g.d. With the exception of possibly 14 m.g.d. most of this large amount or 844 m.g.d. passes into the bay through the Narrows. This seems to be a tremendous volume but when it is compared with the entire flow of water through this section it is not so imposing. In the *Report of the Metropolitan Sewerage Commission of New York* (1914), a U. S. Coast and Geodetic Survey letter describes a discharge at the Narrows of 105,000 m.g.d. at ebb tide, and 97,500 m.g.d. at flood tide, averaging 101,250 m.g.d. The flow of sewage at this point is, therefore, about 0.84 per cent of the diluting water there. In other terms, there are 119 gallons of diluting water for each gallon of sewage.

There are approximately 55 and 25 m.g.d. of sewage coming from Arthur Kill (plus Newark Bay) and the Raritan River respectively. Although precise figures on the flow of water in these two tributaries are not available, both of them are relatively large with 25' to 40' channels, and unquestionably have sufficient quantities of water issuing from them to give a dilution factor

higher than that for the Narrows. The contribution to the bay from the Shrewsbury River (0.1 m.g.d.) is too small as compared to these others to warrant further consideration of it. It should be kept in mind, also, that a large proportion of the sewage heretofore mentioned enters the contributing

TABLE I

SEWAGE CONTRIBUTED TO RARITAN BAY
(Directly or by way of tributary streams)

	Approximate Discharge in m.g.d.			
Receiving Waters	*Treated*	*Incompletely Treated*	*Untreated*	*Sources of Waste—in General*
Hudson River	26.0	....	11.0	N. Y. State—Westchester Co.
	....	....	0.5	" Bronx Boro.
	18.0	....	121.3	" Manhattan Boro.
East River	....	....	90.0	" Manhattan Boro.
	....	....	99.0	" Bronx Boro.
	....	....	280.5	" Manhattan and Bronx Boros.
	....	....	15.6	" Queens Boro.
	....	....	102.5	" Brooklyn Boro.
Upper Bay	....	....	117.4	" Brooklyn Boro.
and Narrows	2.2	....	6.3	" Staten Island
Kill Van Kull and Arthur Kill	....	....	13.7	" Staten Island
(Sub-total 1)	46.2	....	857.8	N. Y. State
Shrewsbury River	0.7	0.1	0.1	N. J. State—5 municipalities
Matawan Creek	0.2	....	....	" Matawan
Arthur Kill	....	....	41.0	" Rahway and Elizabeth Valleys
Raritan River	5.4	4.2	16.3	" 21 municipalities and private groups
Newark Bay	5.1	13.7	9.0	" Hackensack Valley
Upper Bay	....	166.0	....	" Passaic Valley.
(Sub-total 2)	11.4	184.0	66.4	N. J. State
Total A (1 plus 2)	57.6	184.0	924.2	N. Y. and N. J. States
Raritan Bay	3.3	....	1.1	N. Y. State—Staten Island
	42.0	....	44.0	" Brooklyn Boro.
(Sub-total 3)	45.3	....	45.1	N. Y. State
Raritan Bay	0.8	0.5	....	N. J. State—3 municipalities
(Sub-total 4)	0.8	0.5	....	N. J. State
Total B (3 plus 4)	46.1	0.5	45.1	N. Y. and N. J. States
Grand total (A plus B)	103.7	184.5	969.3	

streams at varying distances from Raritan Bay and has received partial natural treatment (dilution and oxidation) before passing into the bay.

Let us now examine the amounts of sewage entering the bay directly—because of proximity—a far more important question in so far as shellfish growing areas are concerned. From New Jersey there is no direct flow of raw sewage into the Bay. From New York there is about 1.1 m.g.d. of untreated sewage entering Princess Bay, a small arm of Raritan Bay and 44 m.g.d. Sheepshead Bay. Exactly speaking, this last discharge is not directly into Raritan Bay being at a point some distance toward the sea from a line drawn between Norton Point on Coney Island to Sandy Hook. However, as these wastes ebb and flood out of and into the bay they are brought into the discussion.

Summing up the question of raw sewage contributions, we find fairly adequate dilution available for those wastes not directly deposited in the bay; 1.1 m.g.d. discharged immediately into the bay on the New York side; and 44 m.g.d. deposited at a point on the same side sufficiently close to bay waters to have an effect on them because of tidal currents. Although this bay occupies an unfortunate position for shellfish cultivation on account of the metropolitan character of the surrounding territory, the great volume of water in it seems to afford fair protection to certain selected areas. If only a small portion of these wastes were in direct contact with the shellfish areas under consideration there would have been little purpose in this study, but dilution and other factors to be discussed force one to entertain more favorable conclusions regarding their quality.

EFFECT OF CHANNELS

As I have pointed out, the greater volume of sewage entering Raritan Bay does so through the Narrows although smaller amounts also come in from Arthur Kill and the Raritan River. Without considering certain physical factors, one might assume that all of these wastes would mix thoroughly with the entire mass of bay water. There is, without doubt, some intermingling at the edges of the flow coming through the Narrows from Upper Bay but on the whole it follows a fairly well defined path. The same is true of the discharge from Arthur Kill but not so much of that from Raritan River which tends to mix more completely with the waters in the western end of the bay.

In my opinion the two principal forces controlling these wastes and working to keep them out of New Jersey waters are the channels and the tidal currents. The Upper Harbor flows carrying the bulk of New York City's sewage tend to move out to sea through Ambrose Channel while those from Arthur Kill seem to follow the 30' channel running from the tip of Staten Island up into Princess Bay and from Seguine Point in that bay toward Sandy Hook. This tendency was observed on the waters during our traverses of the lines of sampling points and could be recognized through the movements of floating debris.

TIDAL CURRENTS

The evidence on the directions of flow secured through a study of the tidal currents in these waters is more compelling. *Special Publication # 152* of the U. S. Coast and Geodetic Survey entitled "Tidal Current Charts—New York Harbor" gives 24 charts, each of which shows the direction and velocity of the tidal currents for its specific tidal hour at Governors Island, N. Y. The following descriptions are of those charts which produce the most proof to assist this study:

1. At low water—Southern Raritan Bay water and that within Sandy Hook is moving

to sea. Upper Bay water is, in the main, moving to sea although there is a slight tendency for it to encroach on the New York side of Raritan Bay.

2. At 1 hour after low water—Sea water is moving in, pushing the Upper Bay flow over onto the New York side of Raritan Bay to such an extent that there is a current created flowing directly from the Upper Bay across Raritan Bay in New York, around the southern end of Staten Island and up Arthur Kill to a slack point located just north of Staten Island's southern tip.

3. At 2 hours after low water—The currents at this time are much the same as described for 1 hour after low water except that the sea water has reached a point farther in Raritan Bay and slack water in Arthur Kill is up to the northwest tip of Staten Island.

4. At 3 hours after low water—The incoming tide has now reached such proportions that it cuts off the flow from Upper Bay not permitting it to cross Raritan Bay.

A normal tidal current flow is represented by the chart for 2 hours after high water, a description of which is as follows:

The flow from the Upper Bay is moving down and out toward the sea at a distance from Coney Island of about half the opening between Coney Island and Sandy Hook, while the flow from Arthur Kill is moving across Raritan Bay, confined right definitely to the northern half, on by Sandy Hook and out to sea.

What can be deduced from this information? First, that depending upon the tide, the sewage coming through the Narrows either flows smoothly out to sea with only its edges intermingling with clean water or is pushed back toward the New York shore to such an extent that it flows westward over Raritan Bay and up Arthur Kill, and second, that the flow from Arthur Kill and to some extent from Raritan River on the flood tide goes northeast into Princess Bay and then directly across Raritan Bay on the New York side and out to sea. Probably more than anything else, these tidal currents help to restrict the New York wastes to New York waters thereby protecting the waters of the New Jersey portion of Raritan Bay.

Reverting now to my summation of the quantities of raw sewage entering directly into the Bay, let us consider them in conjunction with the tidal currents. At Princess Bay, 1.1 m.g.d. is discharged directly. This small volume must be caught up in the tidal current moving from the mouth of Arthur Kill up into Princess Bay and then off toward Sandy Hook. This quantity combined with what comes out of Arthur Kill and Raritan Bay seriously affects the New York side of the bay but does not seem to spread to such an extent as to reach the bulk of the New Jersey waters. The 44 m.g.d. deposited in the vicinity of Sheepshead Bay is flooded back up through the Narrows or toward Staten Island and then ebbed out to sea. Some of it probably works over toward Princess Bay and to a minor extent in toward Sandy Hook after several ebbs and floods of the tide.

FLOAT STUDIES

The 1914 report of the Metropolitan Sewerage Commission includes a number of charts of float studies made in New York Harbor and adjacent waters. Only one chart of the group showing floats started at various points in the Upper Harbor or outside of Sandy Hook gave evidence that New York sewage might approach as close to the New Jersey side of the bay as Romer Shoal light. All others supported the theory that but little of the sewage discharged through the Narrows or along Coney Island reaches New Jersey waters in any appreciable amount.

WINDS

Tidal currents when undisturbed by other influences may be presumed to remain fairly consistent in their movements, but strong winds have been known to deflect large quantities of

water from their normal paths. What then is the history of winds in this area? For the 10 year period 1925-1935, the Weather Bureau reports that northwest winds prevailed in this vicinity during the shellfish season (September-April). For the 20 year period, 1915–1935, the average velocity of the winds was 15.2 m.p.h. which is equivalent to a moderate breeze. From the viewpoint of sewage polluted waters being pushed over from the New York side on to New Jersey shellfish areas, we have, therefore, winds from about the most favorable direction. However, the average velocity is so low that the results of this force are not disastrous although there is, without question, some measurable deleterious effect.

Having carefully examined the natural or physical factors, a survey of this kind next requires confirmatory evidence obtainable through bacteriological examinations of water samples from the area under inspection.

PLAN AND PROCEDURE IN WATER SAMPLING

Lines of sampling stations between fixed shore points are most desirable, but in a body of water such as this, such lines cannot always be had. Therefore, it was necessary, on the 5 outer lines which vary in length from 13,000 to 24,000 yards (7½ to 13½ miles), to run by compass and watch, using a boat, the speed of which had been calibrated in advance. The other 6 lines of sampling points were from fixed objects on shore which could be sighted from a moving boat. In addition, there were a few odd stations identified by objects in the water. Altogether 118 sampling stations were selected and all of them were used. Aside from days of severe weather, the sampling routine encountered no difficulties, and on our first regular run of 24,000 yards we checked on a fixed object located at the 22,000 yard point with an error of 100 yards.

The New Jersey State Department of Health conducted most of the sampling work although the writer and his assistant were present on several occasions. Sampling equipment was very simple consisting only of sterile 10 c.c. tubes plugged with cotton and a short stick on the bottom of which was a spring device to hold the tubes in position when forced into the water. The boat's speed, the watch, and the chart of stations were checked constantly by one man who was responsible for the sampling. A pilot operated the boat and a third man took the samples when so ordered. Only top water samples were taken.

From May 20 to June 22, 1935, when this work was done, 5 complete runs were made of the entire series of stations. Starting times were calculated each day to insure in the end 5 samples at each station for the following tidal conditions: (1) High tide, (2) Low tide, (3) Half flood tide, (4) Half ebb tide, (5) ¾ ebb tide. By following this scheme rather than just taking samples at times most convenient to the workers, we had at the end of the survey results which were exactly comparable. In other words, the tide intervals between samples at any one station were exactly the same as the tide intervals for samples at any other station. In so far as I know, this is the only method by which one can secure samples at the same tide intervals when a long series of stations must be covered.

BACTERIOLOGICAL LABORATORY AND PROCEDURE

A laboratory was established by the New Jersey State Department of Health at Highlands, N. J., and all samples were examined the same day they were collected by personnel of that department with a laboratory aide from the

writer's station coöperating. Media and other supplies were brought from that department's central laboratory in Trenton as needed. *Standard Methods of Water Analysis* was followed for the determination of *B. coli.* We did not plant 5 tubes of each dilution for each sample as is sometimes done in surveys of this kind. This procedure entails too much work for a field laboratory and we could have done it only at a sacrifice in volume of work. Hence, in the main, 1-10 c.c., 1-1 c.c., and 1-0.1 c.c. amounts were planted for each sample. As the interpretations were to be drawn on the basis of 1.0 c.c. tube results using those of the 10 c.c. and the 0.1 c.c. tubes as guides, this method was satisfactory.

BACTERIOLOGICAL RESULTS AND THEIR INTERPRETATION

It was also shown for each sampling station the percentage of 1 c.c. tubes positive for *B. coli.* These are the critical values which are used to supplement the conclusions reached by an examination of all other information. In this case, high results were found in the far western end of the bay and in that portion between Sandy Hook Point and Romer Shoal light, and to the northwest of Sandy Hook Point. Except for isolated cases, the bacteriological results in the remainder of the bay were quite satisfactory.

In recent years there has been considerable discussion among those engaged in sanitation activities related to shellfish as to what shall constitute a clean area for growing purposes. The *Report of the Committee on the Sanitary Control of Shellfish in the United States* in its supplementary report of 1927 treats this subject as follows:

> As to what constitutes satisfactory evidence that an area is fully protected against contamination with disease producing microorganisms, judgment in any given case should be based upon all the facts available, considering different observations not separately but in their relation to each other. Thus, the correct interpretation of bacteriological examinations depends to a considerable extent upon what is shown by sanitary inspection and *vice versa.* Hence it would be unwise to attempt to set up any specific and inflexible standards of acceptability in terms of findings on sanitary survey or bacteriological examination or both. It is our opinion, however, that on the basis of such examinations as have been outlined, areas may be classified generally as follows with respect to their fitness for the taking of shellfish for market:
>
> (1) Areas from which the taking of shellfish should *not* be permitted.
>
> (2) Areas which may be approved for the taking of shellfish without serious question. This class includes the areas which are so protected against human fecal contamination by distance from sources of such pollution, by dilution and by the time afforded for natural purification, that there is no discoverable likelihood of dangerous contamination.
>
> (3) Areas which are intermediate between the first and second class as regards exposure to and protection against fecal pollution.

The U. S. Public Health Service after having done considerable work of this character has arrived at the conclusion that generally not more than 50 per cent of the 1 c.c. tubes in an area should show the presence of *B. coli* if that area is to be used for the taking of shellfish for the market. This is not an inflexible figure and can be used only as a guide when weighing all the evidence collected. This figure is in general use today for our field work and was applied in this specific survey.

On this basis the areas pointed out above were looked upon with suspicion, and when considered in the light of the quantities of sewage coming into the waters at the mouth of Arthur Kill and through the Narrows, the movement of the tidal current back and forth across the mouth of the Narrows, and the prevailing northwest winds, it was concluded to urge the closing of an additional area adjacent to Sandy Hook Point.

In 1925, all of the New York side of the Bay was closed, and in 1934 a quarter mile strip along the New Jersey shore line. This work added to these condemned sections a triangular piece of water beginning at Sandy Hook Point and running along the channel leading to Seguine Point near Princess Bay in New York, thence along the state boundary line which passes through Romer Shoal light.

After proper action by the New Jersey authorities this area was officially closed whereupon the New York City Board of Health opened that city's markets to products from these waters with the provision that string clams be marked "For cooking purposes only."

FUTURE OF AREA

The future of this area appears brighter. In New Jersey, Keansburg and Keyport (both immediately on the bay) have been ordered to improve their sewage treatment facilities and at Keyport a new plant is being constructed; action is progressing to clean up the Shrewsbury River further; wastes contributed to Arthur Kill by New Jersey communities will be measurably reduced by new plants for the Rahway and Elizabeth valleys both of which are under construction; certain improvements in facilities in towns discharging to the Raritan River are under state and court orders; and the operation of the new Perth Amboy plant has removed the menace of a large volume of raw sewage which was formerly discharged at a point extremely close to the shellfish beds. In New York, the new Coney Island plant will alleviate the situation at Sheepshead Bay where now 44 m.g.d. of raw sewage discharges directly east of the bay; the Wards Island plant will remove about 280 m.g. from the East River daily; and the completion of the plans for treating the sewage from Staten Island in 7 more plants will materially reduce the contributed load on the waters of the Upper Bay, Kill Van Kull, and Arthur Kill.

CONCLUSION

Extension of the safe shellfish grounds in this bay, therefore, await the installation of more sewage treatment works. A continuation of the present open area depends largely upon the efficient and unceasing operation of the plants in New Jersey located on Raritan Bay and its tributaries. Consequently, as in other cases, the life of this local industry is to a large degree dependent upon municipal authorities and sewage works operators. I trust that your efforts will all be toward making it possible for this industry to grow and flourish.

Public Health for All

JUST like disease, public health does not recognize any man-made or natural barriers dividing the people or for that matter any distinction of caste, creed, or colour, so that in this respect all are for one and one for all. The whole of the human race is liable to the *same diseases and establishes the* brotherhood and equality of man in one respect at least and as public health is a counter measure to disease its laws apply equally to all.—D. R. Mehta, M.B., The Edinburgh Congress, *J. State Med.*, XLIV, 6 (June), 1936.

Laboratory Problems in the Control of Meningococcus Meningitis*

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OUTBREAKS of meningococcus meningitis offer adequate evidence of the futility of the control measures which have been employed, and the literature gives slight promise of the immediate development of effective control measures which can be generally applied. Carriers have commonly been considered more important in the transmission of the disease than cases, yet carrier surveys, as usually carried out, have complicated the administrative problems involved without aiding materially in control. The carrier incidence in a group may run above 35 per cent and the outbreak abate without their segregation. In other instances, the segregation of carriers, as found, has had no influence on the course of the outbreak. As a result of such observations the wholesale meningococcus carrier survey has fallen into disrepute, probably to the best interests of all concerned.

The wholesale carrier survey has, at least, served to emphasize the fact that there are many problems in the bacteriology, infection, immunity, and epidemiology of meningococcus meningitis which have not been worked out or have been ignored in routine work. The responsibility for improvement in methods of control rests squarely on the laboratory, and if any success is to be attained the laboratory worker must approach each outbreak as an applied research problem rather than with the aim of getting the largest number of carrier cultures made in the least possible time. This premise justifies this incomplete presentation of certain theoretical phases of the subject and the fragmentary observations cited as offering possibly some basis or stimulus for studies on the epidemiology of the disease.

No small part of the confusion which exists arises from attempts to evaluate observations and findings on the same basis as is used in considering the more highly communicable diseases. A meningococcus meningitis outbreak cannot be compared with a typhoid outbreak and a meningococcus carrier does not have the same epidemiological significance as a typhoid carrier. A better understanding of the problem may be obtained by a classification of communicable diseases which divides them into those of universal susceptibility and definite epidemiology and those of limited susceptibility and obscure epidemiology.

I. DISEASES OF UNIVERSAL SUSCEPTIBILITY AND DEFINITE EPIDEMIOLOGY

Typhoid fever, smallpox, mumps, and measles offer examples of diseases

* To be read before the Laboratory Section of the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 21, 1936.

of universal susceptibility and definite epidemiology, to which, as a group, the following characteristics may be ascribed:

A. Causative organisms are aggressive invaders of the body, regardless of the severity of the symptoms produced when an invasion has been accomplished.

B. Populations are universally susceptible, unless naturally or artificially immunized.

C. Susceptibility is not related to a lowered general resistance.

D. The carrier level is relatively low in those in which carriers are known to exist.

E. Carriers are almost universally a menace.

F. Cases are usually referable to a known preceding case or carrier.

G. Clinically mild and atypical cases are much less common than in the second group.

H. Control measures are fairly well established.

II. DISEASES OF LIMITED SUSCEPTIBILITY AND OBSCURE EPIDEMIOLOGY

Meningococcus meningitis, poliomyelitis, the pneumonias, and undulant fever are examples of this group, and as a result of extensive immunization diphtheria also may possibly be included in this group. The chief characteristics of the group are:

A. Causative organisms are not aggressive invaders of the body. Virulence involves at least 2 factors: the aggressiveness of the organism as an invader, and the ability to produce severe symptoms when an invasion has been accomplished. These 2 factors are well correlated in diseases of universal susceptibility, but the correlation is not so marked among the diseases of limited susceptibility. The meningococcus is ordinarily a poor invader at best, but even the poorest invaders among the meningococci may attack with much fury when, through some combination of circumstances, an invasion has been accomplished.

B. Only a limited portion of the population is susceptible. If the intradermal skin test with meningococcus toxin, adjusted by tests on newly developed cases of meningococcus meningitis, is a reliable index, findings bear out this statement. The writer has made 626 such tests on institutional and residential populations among which cases of meningococcus meningitis had occurred. On the basis of the edema and erythema produced, 25.7 per cent were slightly susceptible and 1.5 per cent were highly susceptible. Younger groups showed a greater susceptibility than older.

C. A lowered general resistance is usually essential to an invasion by organisms of average virulence, even in the susceptible group. Case histories in meningococcus meningitis usually reveal some predisposing factor which has tended to lower the resistance of the individual. These include upper respiratory infections, otitis media, gastrointestinal upsets, extreme and prolonged fatigue, prolonged exposure to inclement weather, the excessive use of alcohol, and numerous less easily detected causes.

D. The carrier level is relatively high in diseases in which carriers are known to exist. Several instances have been reported in which the meningococcus carrier incidence exceeded 50 per cent. Glover [1] considers that when the carrier level reaches 20 per cent, the community is in danger of an outbreak of meningitis.

E. Carriers are not universally a menace. Effective meningococcus carriers are probably few in number. One error in the carrier survey has been a lack of understanding of the fact that there are epidemic, non-epidemic or sporadic, and probably saprophytic strains of the meningococcus, similar in characteristics to those reported among the pneumococci. This grouping fits in nicely with the generally accepted type classification of meningococci. The actual epidemiological basis for the classification is that phase of virulence which has to do with the aggressiveness of the organism as an invader of the

deeper tissues. Rake[2] groups meningococci on the basis of Gordon's classification:

Type I–III: Parasitic or epidemic and responsible for nearly all the large epidemics and most of the small ones.

Type II: Normally a saprophyte, frequently present in the throats of normal individuals. Can also act as a parasite and produce sporadic cases of the disease and even limited epidemics.

Other types: Saprophytes, present in the throats of normal individuals where they seem to cause no harm. Only occasionally do they cause a sporadic case of meningitis.

In general, the carriers of non-epidemic and saprophytic strains of the meningococcus are more consistently positive on repeated culture and the condition is of longer duration than is the case with carriers of epidemic strains. The non-epidemic and saprophytic strains are more easily grown than are the epidemic strains. It seems likely, then, that most of the carriers detected in routine carrier surveys have been of no epidemiological significance.

The dangerous carrier of epidemic strains is frequently of the chronic, intermittent type, capable of transmitting massive infections at times but with intervals when the meningococcus is apparently not present in the superficial tissues of the posterior nasopharynx. An individual may be able to resist the attack of a few poor invaders but succumb to a large number of these same organisms when his general resistance has been lowered by some predisposing factor. Limited studies on chronic, intermittent carriers of epidemic strains have shown that individuals may yield practically pure cultures of meningococci at times, while at other times few or none are found.

This intermittent character of effective carriers is one factor which contributes to the baffling epidemiological picture often observed and accounts, in some instances at least, for the failure of the carrier survey. The writer[3] has reported a carrier of Gordon Type I–III meningococci who appeared to have been responsible for 5 cases in an institution, distributed over a period of about 9 months and who continued to give an occasional positive culture for 5 months more. Rake[4] has reported carriers of this sort in which repeated cultures were negative for periods of several months, after which positive cultures were again obtained. The unreliability of the usual regulations for the release of carriers becomes apparent in the light of such findings.

Since the inference has been made that the technic commonly used in carrier surveys may not always detect the dangerous carriers, a word regarding technic may not be amiss. The technic which gives some assurance of isolating and identifying the less easily cultivated epidemic strains of the meningococcus, lends itself better to an intensive and prolonged study of a carefully selected group than to a single culturing of an extensive group selected by administrative order or in a haphazard manner. The writer has set an arbitrary, maximum limit of 40 cultures per day when working alone in the field, and this may be too high for best results. Space does not permit a detailed description of the technic involved, and the reader is referred to the excellent outline of the subject by Branham[5] for further information. Certain points will bear emphasis, however: (1) There are no reliable short-cuts in technic, such as the use of Olitsky's medium; (2) the identification of freshly isolated strains of the meningococcus cannot always be safely based on agglutination reactions, to the exclusion of carbohydrate fermentation; (3) typings must be made, without exception, if the findings are to be of any epidemiological significance.

F. Cases are not usually referable to a preceding case or carrier, as found. This statement holds true in the ma-

jority of meningococcus meningitis outbreaks. Painstaking and detailed epidemiological investigations have led on several occasions to the selection of a small group which, upon repeated culturing, has yielded a chronic intermittent carrier who fitted into the epidemiological picture and whose removal coincided with the end of the outbreak.

G. Clinically mild and atypical cases are very common and may exceed the clinically typical cases in number. Ordinarily only meningococcus infections involving the meninges are recognized; yet there is considerable evidence that a meningococcus septicemia always precedes the meningitis, and meningococcus septicemias without meningeal involvement have been repeatedly reported. Meningococcus meningitis following sinus involvement occurs frequently enough to suggest that the meningococcus may be the causative organism in many sinus infections, rather than a secondary invader. Upper respiratory infections are also numerous during an outbreak of meningococcus meningitis. Are these the usual run of respiratory infections or are these individuals suffering from a mild form of local meningococcus infection as has been suggested by Mink [6] and others.

Certainly meningococcus infections without meningeal involvement offer greater opportunities for the dissemination of the parasitic types of organism than cases of meningitis, and considerable study may well be devoted to the problem.

H. Control measures are not as well established as in the group of diseases of universal susceptibility. The measures used with the first group of diseases are employed as a matter of form, but the special measures which have proved slightly more effective are those which contribute to the maintenance of a high level of general resistance in the individual.

These characteristics of diseases of limited susceptibility and obscure epidemiology cast some light on the problems involved. Outbreaks will be cited as illustrative of some of these points and extensive observations along these lines may give some information of value in the control of the disease.

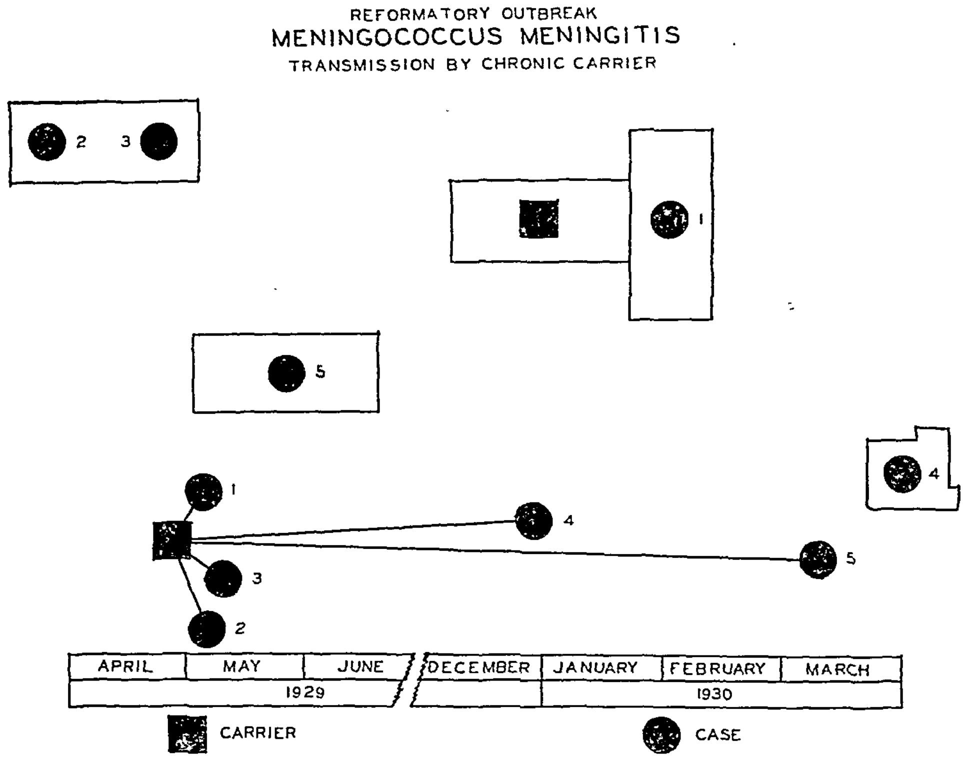
Some mention should be made of the use of meningococcus toxin. The production of meningococcus toxin by Ferry, Norton, and Steele [7] has introduced the possibility of its use for intradermal skin tests, as an index of immunity, and for artificial immunization. Kuhns [8] and the writer have both done some work along these lines but extensive use and prolonged observation will be necessary before definite conclusions may be drawn.

The almost universal observation of a lowered general resistance as a predisposing factor for the development of cases of meningococcus meningitis, involving organisms of average virulence, suggests that the intradermal skin test may only give an index of one of several factors concerned in susceptibility to the disease.

Limited experience with the use of raw meningococcus toxin as an immunizing agent also indicates that the amount which can be injected without causing severe reactions is not sufficient to produce as high a degree of immunity against the intradermal skin test as is desirable. There are also some observations that suggest that the use of meningococcus toxin may only immunize against certain minor clinical symptoms, similar to what has been alleged in connection with the immunization against scarlet fever with streptococcus toxin.

These statements are not intended as a criticism but as a caution against over-enthusiasm and inadequately supported claims. The only communicable diseases which may really be considered as controllable are those for which an easily used, active immunization has

FIGURE I



been developed. For meningococcus meningitis, whether this be meningococcus toxin, an autolyzed meningococcus filtrate or some other product, studies aimed at the production of an effective agent for active immunization seem to offer the greatest promise of successful control of the disease.

The following outbreaks of meningococcus meningitis serve to emphasize certain of the characteristics of the disease which have been outlined above.

1. REFORMATORY OUTBREAK

This outbreak occurred in a state reformatory with about 650 inmates and 50 officers and their families.

Figure I shows both the geographical and chronological distribution of cases. Five cases occurred, 3 among officers (Cases 1, 4, and 5) from 35 to 67 years of age, and 2 among inmates (Cases 2 and 3) under 21 years of age. Wholesale carrier surveys, made after the development of both the 3rd and 4th cases, were of no value in control.

The organism involved in the last 2 cases was identified as a Gordon Type I–III meningococcus and it was assumed that there was probably a chronic carrier of this organism either among the officers or their families, since 3 of the 5 cases had been officers. The next culturing was limited to officers, their families, and "H" Company, the last case having been the captain in charge of "H" Company.

No carriers of Type I–III meningococci were found among the officers or their families, but one member of "H" Company, who had given negative cultures on both the wholesale carrier surveys, gave practically a pure culture of meningococcus which could not be distinguished from those isolated from the spinal fluid of the last 2 cases. The relation of this carrier to the cases was as follows:

April 25, 1929—Carrier committed to the reformatory, assigned to "H" Company and detailed to the rock quarry force.

May 4, 1929—Case 1 (the captain in charge of the rock quarry force) developed meningococcus meningitis. He was a robust individual, apparently in the best of health, who had returned from a week's spree on April 27, 2 days after the carrier entered the reformatory. In the 2 or 3 days after his return to duty, he had helped the carrier lift heavy rocks. The explosive exhalation of breath while under the strain of this work had given ample opportunity for droplet infection.

May 8, 1929—Case 2 ("G" Company) developed meningococcus meningitis. He was also assigned to the rock quarry force and had been a friend of the carrier before entering the reformatory. He was an undernourished individual who had contracted a severe cold about 3 days prior to the appearance of meningeal symptoms. Ample opportunity for infection was given both at work and through the practice of passing a pipe from mouth to mouth while on the recreation grounds. Case 3 also participated with these 2 in this practice.

May 13, 1929—Case 3 ("G" Company) developed meningococcus meningitis. Occupied the bunk next to Case 2 in quarters and was a close associate of both the carrier and Case 2. He was undernourished, anemic, and was noted for repeated admittances to the infirmary on diagnosis of hysteria.

December 26, 1929—Case 4 (Superintendent of the reformatory) developed meningococcus meningitis. He was an obese, elderly individual who had lost 20 lb. in the month prior to the development of meningitis as a result of a severe, protracted cold and the worries incident to assuming management of the reformatory.

The carrier had escaped from the institution and upon his return was required to report in person to the superintendent daily. The superintendent made it a practice to get extremely close to those with whom he conversed, thus increasing the opportunities for droplet infection. He developed the disease 7 days after his first interview with the carrier.

March 7, 1930—Case 5 (the captain in charge of "H" Company) developed meningococcus meningitis. He had had a severe gastrointestinal upset a few days before. He probably acquired his infection when he forced the carrier against the wall and choked him, in quelling a disturbance in quarters 6 days prior to the onset of his illness.

This carrier was cultured at frequent intervals over 5 months. The majority of cultures failed to show meningococcus. An occasional culture showed a few meningococcus colonies and twice almost pure cultures were obtained, establishing his status as a chronic, intermittent carrier capable at times of transmitting massive infections.

The writer[3] has reported a similar outbreak in a state penitentiary, involving a Gordon Type I meningococcus. Wholesale carrier surveys were of no value in control and the geographical and chronological distribution of cases was similar to the reformatory outbreak. Epidemiological studies revealed that all the cases had occurred among skilled men in the building trades who worked together on construction jobs about the prison. Careful culturing of the remainder of this limited group revealed a chronic, intermittent carrier who was quartered in a cell house where no cases of the disease had developed. As with the reformatory outbreak, the institution was free from meningococcus meningitis for a number of years following the removal of the chronic carrier.

These outbreaks emphasize the following points:

A. Carriers of sporadic and saprophytic types of the meningococcus are of no epidemiological significance in outbreaks.

B. The dangerous carrier is of the chronic, intermittent type who is harboring an epidemic strain of the organism and who is capable of transmitting massive infections at times.

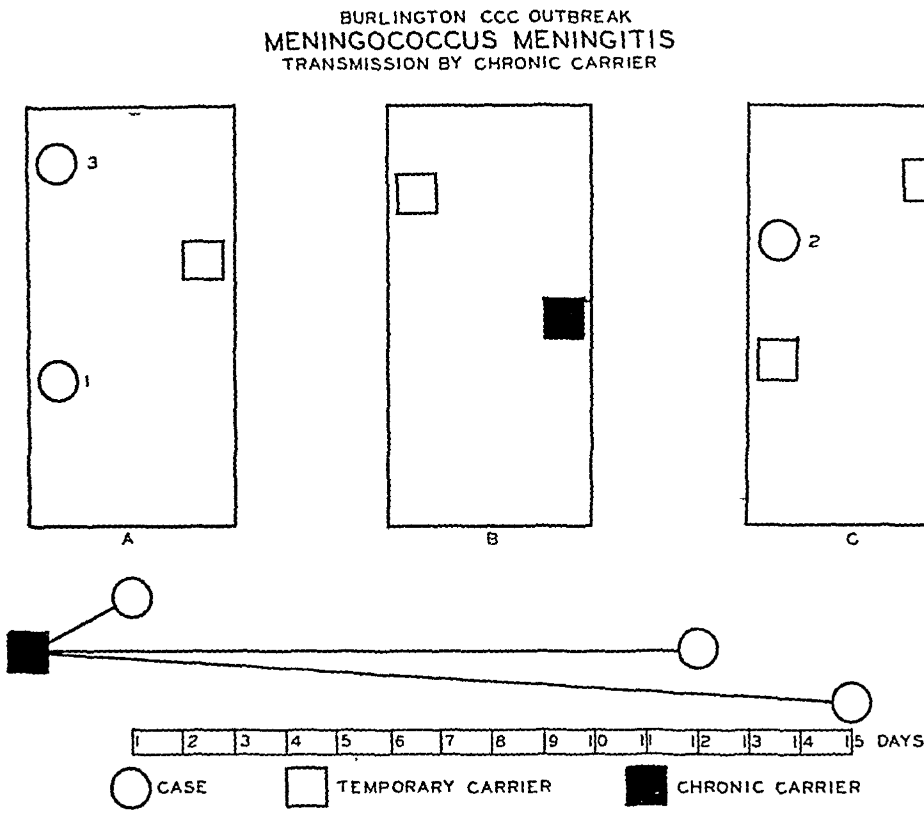
C. A lowered general resistance of the individual, coupled with a massive infection is essential for a successful invasion by meningococci of average aggressiveness.

D. Careful epidemiological studies may be of value in selecting the group which includes the effective carrier.

2. BURLINGTON CCC OUTBREAK

This outbreak occurred in a Civilian Conservation Corps Camp at Burling-

FIGURE II



ton, Kan., in November and December, 1935. The personnel of the camp included over 200 enrollees, officers and supervisors who were quartered in cantonment type barracks.

Figure II shows the chronological distribution of cases and their location in barracks. Three cases occurred at intervals of 12 and 3 days, respectively, among enrollees. Two cases (Cases 1 and 3) were quartered in Barrack A, and 1 case (Case 2) in Barrack C. Typings were not entirely satisfactory because of broad agglutinations and absorptions, but somewhat better results were obtained with Type III sera than with other types and the organism was considered an epidemic type.

Preliminary epidemiological investigations gave no significant leads and it was decided to culture the entire camp personnel in groups of a size in which it would not be necessary to sacrifice accuracy of technic to speed. Thirty-one, or 14.2 per cent, of the 217 persons cultured were found to be meningococcus carriers.

This was the first outbreak handled by the writer in which he had the courage of his convictions as regards the carriers of epidemic and non-epidemic strains of the meningococcus. Of the 31 carriers identified, 26 yielded non-epidemic or saprophytic strains and 5 epidemic strains. Only the 5 carriers of epidemic strains were isolated. One of these 5 carriers, quartered in Barrack B where no cases of the disease had developed, proved to be a chronic, intermittent carrier of an organism which closely resembled those recovered

from 2 cases. He had been closely associated with the 2 patients either in tussles or contests of strength and skill prior to their illness, which may account for their infection.

The writer had charge of this outbreak which Kuhns[8] has cited as an example of successful control through the use of meningococcus toxin for immunization, in which opinion the writer does not concur. Skin tests for susceptibility were read jointly by the camp surgeon and the writer on December 5, the day that the carriers of epidemic strains of meningococci were isolated. No new cases developed between December 5 and December 20, when the 4th dose of meningococcus toxin was given to the 89 skin test reactors among the camp personnel. Certainly the toxin cannot be given credit for the prevention during a considerable portion of the immunization period. This absence of cases may be due to the vagaries of the epidemiology of the disease, but the whole outbreak so closely resembles those of the reformatory and penitentiary mentioned above, as well as others in the writer's experience, where removal of chronic intermittent carriers of epidemic types of meningococci has coincided with the end of the outbreak, that this fact cannot be ignored.

3. SPEARVILLE CARRIER

The history of this carrier presents some interesting possibilities both as to the duration of the chronic carrier state and the production of cases by carriers of non-epidemic or sporadic strains of the organism.

The mother of a family of 11 children, residing on a large wheat farm, had meningococcus meningitis in 1928 and recovered. Since that time, 3 of her 11 children have developed the disease: 1 case, fatal, in February, 1930, 1 which recovered, March, 1930, and 1 which recovered in March, 1936.

Cultures made early in June, 1936, revealed the fact that both the mother and her 3 year old daughter were carrying a Gordon Type II (sporadic) meningococcus which had rather broad cross-agglutination and absorption reactions with both Types I and III sera.

The number and distribution of cases suggests that this woman has been a chronic, intermittent carrier of a non-epidemic strain of meningococcus since her recovery in 1928. A culture made in August, 1936, was negative, and additional studies will be made.

Skin tests made with polyvalent meningococcus toxin in June, 1936, gave negative reactions on the mother and the 2 children who have had the disease. Of the remainder of the family, 5 gave 1 + skin tests, 1 a 2 + test and 1 a 4 + test. The 4 + test is comparable to the skin test susceptibility of newly developed cases of the meningococcus meningitis which have been tested. These results suggest that other factors than skin test susceptibility are more important than the skin test in the transmission of the disease.

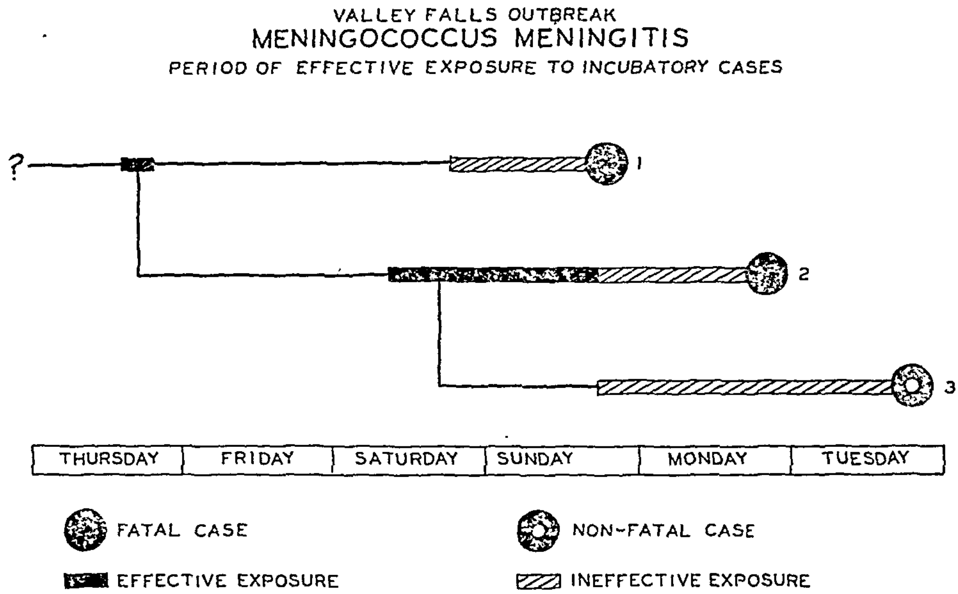
Transmission of meningococcus meningitis by clinical cases of the disease has not appeared to be as common as transmission by carriers. The following outbreaks illustrate the usual and exceptionally rare types of transmission by cases:

4. VALLEY FALLS OUTBREAK

Three cases developed on successive days, 2 were high school students and the 3rd a sister of the 2nd patient, was a grade school pupil (Figure III).

The source of infection in the first case is not known, but in view of the rather definite incubation period in Cases 2 and 3, the patient probably acquired his infection either Wednesday night or Thursday morning. Case 2 acquired his infection from Case 1 while returning from a basket ball game

FIGURE III



in an open truck. The 2 boys became chilly during the 20 mile trip and put their heads together under a blanket, giving ample opportunity for transference of the organism from Case 1, then in the early incubation stage. Patient 3 was the sister of patient 2 and was at home with her brother during the early stages of his incubation period. A culture of Case 2 taken a few hours before the development of clinical symptoms failed to show the presence of meningococci.

Each of these patients was in contact with several children in their respective families during that stage of the incubation period just prior to the development of clinical symptoms and no cases resulted, while exposures during the early stages of the incubation period were productive of cases. All of the children exposed were suffering from severe colds with laryngeal involvement, which would be considered a predisposing factor to infection, yet cultures taken shortly after the development of cases showed no meningococci.

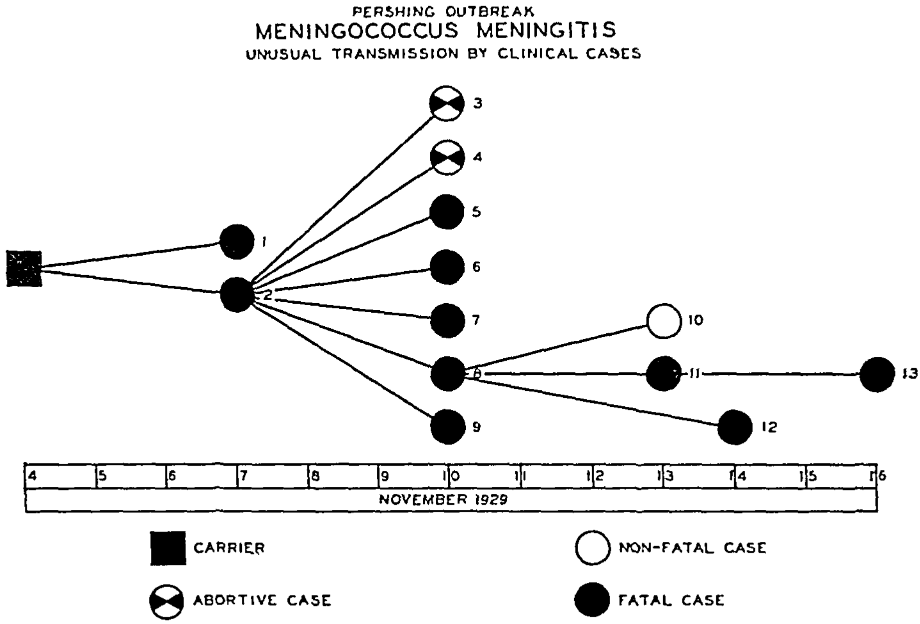
This illustrates the common observation that clinical cases are most infectious during the first 24 or 36 hours of the incubation period when large numbers of meningococci are present in the posterior nasopharynx and massive infections can be transmitted. In most instances the organisms enter the deeper tissues and disappear from the nasopharynx before the appearance of clinical symptoms, and the case is no longer infectious.

5. PERSHING OUTBREAK

This has been reported [3] but is briefly presented because it graphically shows the rather unusual transmission of the disease by fulminating cases after clinical symptoms have developed. This outbreak was due to a Gordon Type I organism of exceptional aggressiveness as an invader.

Figure IV shows the chronological grouping of cases and sources of infection. Most of the cases were persons of middle age, the incubation period was 3 days, and most of the patients died in from 11 to 14 hours after the appearance of the initial symptoms. A total

FIGURE IV



of 23 persons were exposed to these cases during the clinical stages, 11 of whom developed the disease.

While such effective transmission will not ordinarily be encountered, the possibility must be considered in fulminating outbreaks of the disease. While such outbreaks are spectacular and terrifying, they offer a much simpler problem of control than the usual type.

SUMMARY

The theories presented and outbreaks cited cast some light on the problems involved in the transmission of meningococcus meningitis and somewhat similar studies may be of material assistance in the development of methods of control of the disease.

Studies dealing with the following problems are suggested:

A. Epidemiological significance of what have been termed epidemic, non-epidemic, and saprophytic strains of the meningococcus.

B. The prevalence and epidemiological significance of meningococcus infections other than meningitis.

C. The epidemiological relationships of chronic, intermittent carriers to sporadic cases and outbreaks of meningococcus meningitis.

D. Improvement in the technic of culturing meningococcus carriers.

E. Predisposing factors to meningococcus infection.

F. The development of reliable and easily applied tests for immunity to meningococcus meningitis as well as effective methods of immunization.

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Interstate Sanitation Compact and Its Implications*

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ALTHOUGH the New York State Department of Health had long realized that it was imperative to protect our streams from pollution in order to conserve the public water supplies derived from surface sources, no definite action was taken by the state to control stream pollution until the so-called "anti-pollution" law was enacted in 1903. By that time nearly all of our large rivers and many of our small streams had become seriously polluted, only 3 relatively small municipalities having installed sewage treatment plants. The New York law is similar to the anti-pollution laws of a number of other states, and in general prohibits the discharge of sewage and industrial wastes into any of the waters of the state without the approval of the State Commissioner of Health. However, municipalities and industrial plants which were discharging sewage and wastes prior to that time were exempted from the operation of the law.

The State Department of Health has had many obstacles to overcome in its efforts to clean up our streams. Municipalities and industrial concerns had come to look upon the discharge of untreated sewage and wastes into streams as a vested right and seemed to resent any interference with this practice. The constitutional limitations on the bonding power of municipalities and the high cost of the interception and treatment of sewage has delayed our campaign against stream pollution. Experience in New York indicates that the cost of providing for the interception and treatment of sewage of municipalities varies from $5 to as high as $100 per capita with an average of $25. The cost of such work for the City of New York alone is estimated at between $243,000,000 and $378,000,000, depending upon the degree of treatment provided.

Although municipal officials usually realize the necessity for providing sewage treatment, taxpayers are very often loath to vote favorably on propositions to bond municipalities for such projects. They feel that sewage treatment is primarily for the benefit of downstream communities and that neither they nor the community itself will receive any direct benefit therefrom.

Although the department has required the installation of sewage treatment works in connection with all new

* To be read at a Joint Session of the Conference of State Sanitary Engineers and the Public Health Engineering Section of the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 20, 1936.

sewer systems constructed since the anti-pollution law was enacted in 1903, and as a result there are now 209 sewage treatment plants serving a population of nearly 2,500,000, the sewage from a population considerably greater than the entire population of the state in 1903 is being discharged without any treatment into the waters of the state. This is due in a large measure to the phenomenal growth of New York City, which has a population greater than that of the entire state in 1900, but treats only a small portion of its sewage.

The most important and far reaching coöperative effort so far undertaken to control pollution is the Interstate Sanitation Compact that has been drawn up by the states of New York, New Jersey, and Connecticut. The rapidly increasing pollution of the tidal waters in the New York metropolitan area has been a matter of grave concern to the state and local health departments of these states. Although the problem of abating this pollution has been studied for a great many years by various commissions, only a relatively small percentage of the sewage in the New York metropolitan area is receiving any treatment at present. The sewage treatment plants installed so far have been constructed primarily to give local relief where the conditions were particularly objectionable. The volume of sewage so treated has had no appreciable effect on the general problem and has not kept pace with the tremendous growth of this area.

Aside from the high cost of interception and treatment of the sewage for this thickly populated metropolitan area the State Departments of Health of the 3 states involved appear to have been somewhat reluctant to require the municipalities under their jurisdiction to install sewage treatment works, realizing that unless all of the states did likewise their efforts would be nullified to a large extent. Furthermore, before the Interstate Sanitation Compact was consummated there were no uniform or accepted standards to act as a guide as to the degree of treatment to provide.

Some conception of the magnitude of the problem may be gained from the fact that nearly 10 per cent of the entire population of the United States is concentrated in the New York metropolitan area and that the sewage from over 12,000,000 persons, amounting to over 1,300,000,000 gallons, and the trade wastes from some 100,000 industries are discharged daily into the coastal and harbor waters of this district. This quantity of sewage has for years exceeded the assimilating power of these waters and has resulted in the entire depletion of the dissolved oxygen content of the water in a number of areas during the summer months. Of the total population contributing sewage, about 74 per cent are in New York State, 20 per cent in New Jersey, and about 6 per cent in Connecticut.

It has been the general belief that the sewage and wastes discharged into the waters in New York Harbor and its tributaries are promptly carried out to sea by the large quantities of pure water of the Hudson River, Long Island Sound, and the Atlantic Ocean. The fact is that the sewage in the harbor drifts back and forth for days by the action of the tides and that less than 10 per cent of the tidal flow at the Narrows consists of new sea water.

This enormous quantity of sewage and industrial wastes discharged daily carries hundreds of thousands of tons of sewage solids into the surrounding waters each year, about half of which is putrescible organic matter. This material is deposited in the form of putrescible sludge in the steamship slips and channels of the harbor. Extensive dredging operations have to be carried on each year in order to

free the slips and channels of this sludge and other deposits.

Unless this pollution is checked it will be only a matter of time before it will render impossible the enjoyment of the great public beaches built at a cost of millions of dollars and giving recreation and healthful enjoyment to millions of people. Already a number of beaches have been closed to bathing by the New York City Department of Health.

The effect of this pollution upon fish life has been marked. There is practically no fish life existing in certain areas of the district, due largely to the reduction of the dissolved oxygen content of the water. The economic loss due to this condition is hard to estimate. Some of the most productive shellfish areas in the New York metropolitan area have been condemned for shellfish cultivation. According to data furnished by the Conservation Department of New York State there has been a reduction in the number of acres of tidal waters under lease of franchise in this area for the propagation of oysters from 24,400 acres in 1915 to 6,700 acres in 1935. Furthermore, the cultivation of shellfish is prohibited in 81,000 acres of land under water in this district. This condition has resulted not only in a tremendous loss to the shellfish industry but also a loss of revenue to the State of New York.

The pollution of bathing beaches and shellfish beds finally aroused the public and certain metropolitan newspapers to a realization of the seriousness of the pollution problem, and resulted in the calling of a number of conferences in New York City during 1930 to consider ways and means of correcting these conditions. These conferences were presided over by Senator Royal S Copeland, formerly Commissioner of Health of New York City, and were attended by representatives of federal, state, and municipal authorities, as well as other interested citizens.

As a result the 3 states of New York, New Jersey, and Connecticut early in 1931 passed laws creating a temporary Tri-State Treaty Commission directed to

> . . . formulate the terms of a treaty between the 3 states and the federal government in the matter of the prevention and eradication of contamination and pollution of the natural waters flowing or situated between the states of New York and New Jersey or the states of New York and Connecticut and the natural waterways of said states flowing to any such natural waterways and the legislation, state and federal, necessary to make such recommendations effective.

The Tri-State Commission appointed by the governors of the 3 states was non-partisan and was composed of men whose actions were governed solely by consideration of the best public interest. They were assisted by the best engineering and expert talent of the states involved, and the Compact as finally evolved stands out as one of the great achievements in interstate coöperation.

The first meeting of the Tri-State Treaty Commission was held in New York City on June 3, 1931. A number of sub-committees, including the Committee of Engineering and Research, of which the writer was a member, were organized. It was the duty of this committee to fix the areas to be included within the proposed Interstate Sanitation District and to draw up standards of purity of sewage effluent and of the waters within the treaty area.

The legislation legalizing the Compact and standards in so far as New York State is concerned was passed unanimously during the closing days of the 1932 legislature and signed by Governor Roosevelt on March 30, 1932. Although bills legalizing the Compact were introduced in the New Jersey legislature each year since that time, it was not until July, 1935, that the necessary legislation was passed and

signed by Governor Hoffman. The laws passed by New Jersey, however, differed in a number of essential features from those passed by New York in 1932, so that it was necessary for New York to enact identical laws in order to put the Compact into effect in so far as New York and New Jersey are concerned. Such legislation was introduced on January 2 of this year, passed by the legislature on January 14, and signed by Governor Lehman on January 17, 1936. The Compact was approved by a joint resolution of Congress on August 27, 1935. The Compact so far as Connecticut is concerned will become effective whenever that state passes laws identical with those of the other 2 states. The Interstate Sanitation Commission, comprising members from these 2 states, has organized and is now functioning.

Stated in simple terms, the Compact contemplates the elimination of offensive pollution, the making of all beaches in the region safe for bathing and recreational purposes, and the return to shellfish culture of many of the areas now condemned. In the words of the Compact:

> Each of the signatory states pledges each to the other faithful coöperation in the control of future pollution and agrees to provide for the abatement of existing pollution in the tidal and coastal waters in the adjacent portions of the signatory states defined herein as coming within the district, and consistent with such object, to enact adequate legislation which will enable each of the signatory states to put and maintain the waters thereof in a satisfactory sanitary condition, and particularly to protect public health; to render safe such waters as are now used or may later become available for bathing and recreational purposes; to abate and eliminate such pollution as becomes obnoxious or causes a nuisance; to permit the maintenance of major fish life, shellfish and marine life in waters now available or that may by practicable means be made available for the development of such fish, shellfish or marine life; to prevent oil, grease or solids from being carried on the surface of the water; to prevent the formation of sludge deposits along the shores or in the waterways; and with the fulfillment of these objectives to abate and avoid incurring unnecessary economic loss by safeguarding the rights of the public in its varied legitimate uses of the waters of the district.

The area included within the Interstate Sanitation District covered by the Compact comprises the tidal waters in the Metropolitan District, including Newark Bay, Upper and Lower New York Bays, Sandy Hook Bay, and Raritan Bay, the Hudson River north to the northerly boundary line of Rockland and Westchester Counties; Long Island Sound as far east as the easterly side of New Haven Harbor at Morgan Point in Connecticut and the easterly side of Port Jefferson Harbor on Long Island; and the Atlantic Ocean to the easterly side of Fire Island Inlet on Long Island.

With respect to the standards of purity, the Compact provides

> . . . that where tidal waters are used for such varied purposes as bathing, navigation, shellfish culture, the development of fish life, and the disposal of wastes, no single standard of purity is practicable in all parts of the district.

The waters, therefore, were divided into 2 general classes—

> Class A waters in which the designated water areas are expected to be used primarily for recreational purposes, shellfish culture, and the development of fish life.
>
> Class B waters in which the designated water areas are not expected to be used primarily for recreational purposes, shellfish culture, or the development of fish life.

After a careful study and consideration of the local factors involved, the following minimum standards were adopted by the Tri-State Commission:

> 1. All sewage discharged or permitted to flow into Class "A" waters of the district shall first have been so treated as:
>
> a. To remove all floating solids and at least 60 per cent of the suspended solids.
>
> b. To effect a reduction of organisms of the *B. coli* group (intestinal bacilli) so that the probable number of such organisms shall not exceed 1 per c.c. in more than 50 per cent of

the samples of sewage effluent, provided, however, that in the case of discharge into waters used primarily for bathing this bacterial standard need not be required except during the bathing season.

c. To effect a reduction in the oxygen demand of the sewage effluent sufficient to maintain an average dissolved oxygen content in the tidal waters of the district and in the general vicinity of the point of discharge of the sewage in those waters, at a depth of about 5 feet below the surface, of not less than 50 per cent saturation during any week of the year.

2. All sewage discharged or permitted to flow into Class "B" waters of the district shall first have been so treated as:

a. To remove all floating solids and at least 10 per cent of the suspended solids, or such additional percentage as may by reason of local conditions be necessary to avoid the formation of sludge deposits in Class "B" waters of the district.

b. To effect a reduction in the oxygen demand of the sewage effluent sufficient to maintain an average dissolved oxygen content in the tidal waters of the district and in the general vicinity of the point of discharge of the sewage into those waters, at a depth of about 5 feet below the surface, or not less than 30 per cent saturation during any week of the year.

The Compact also provides that all sewage discharged or permitted to flow into any stream tributary to the tidal waters of the district shall be so treated if necessary as to maintain such stream in a sanitary condition at least equal to the requirements laid down for the tidal waters into which it flows.

The Compact sets up a permanent Inter-State Sanitation Commission with authority to make investigations, conduct hearings, and prescribe by orders a reasonable date on or before which each municipality shall treat its sewage in accordance with the standards specified in the Compact. It also provides that nothing in it shall be construed to repeal or prevent the enactment of any legislation or the enforcement of any requirements of any signatory state imposing additional conditions or restrictions to lessen or prevent the pollution of water within its jurisdiction and requires that the Interstate Commission shall coöperate with the respective state authorities having jurisdiction over stream pollution with a view to coordinating their activities and securing the most satisfactory results. For this purpose the Interstate Commission is authorized to prepare a general plan of the most practical and economical method of securing conformity with the Compact and submit such plan to the governor and the legislature of each state and to the state agencies having charge of sewage problems in the respective states.

It should be noted that the standards stipulate the results to be obtained, leaving it to the states and municipalities involved as to how the results shall be reached. The minimum standards adopted, however, can in most cases be met by simple and well known methods of sewage treatment. The tests required to determine if the standards with respect to the sewage effluent or the receiving waters are complied with are also simple and lend themselves to easy determination.

It is felt that the standards for Class A waters are sufficiently high to protect public health and fish life. In fact the *B. coli* standard for sewage effluent is only slightly less stringent than the minimum standards for swimming pools prescribed by the New York State Sanitary Code and are more stringent than the minimum requirements for bathing beaches of New York City.

If the standards set up for Class B waters are met, visible solids of recognizable sewage origin will be removed and no public nuisance or menace to health will be created in such waters. In fact, odor nuisances are not created so long as the dissolved oxygen is not depleted. If it had not been considered desirable to protect fish life a lower dissolved oxygen content would have been permissible.

The fact that shad are still able to

penetrate the pollution barrier of the waters in the metropolitan area and reach the spawning grounds in the Hudson River at the Kingston flats 80 miles above New York Harbor every year under the present low oxygen content of these waters seems to be conclusive evidence that 30 per cent saturation should not be inimicable to shad. Furthermore, if the dissolved oxygen in the vicinity of the outlet from disposal plants does not fall below 30 per cent, the dissolved oxygen in the main body of the water will be considerably greater.

It is believed that if the Compact is faithfully carried out by the states involved, it will expedite the cleaning up of the tidal waters in the metropolitan area; will protect public health and the bathing beaches used by millions of bathers each year; and will return to shellfish culture many of the areas now condemned.

Although the health departments of a number of states have entered into agreements to control the pollution of interstate streams, this is the first time that legal representatives of 3 sovereign states have actually drawn up a compact pledging the abatement of the pollution of interstate waters. The ratification of this Compact should have far reaching effect on the control of stream pollution not only in the states involved but also in other states, which may have similar problems, and should give impetus to the battle for the conservation of our streams and waterways, which constitute one of our most valuable natural resources.

This Compact has already created considerable interest, and the results produced by its enforcement will be watched keenly by state officials charged with the duty of controlling stream pollution. It is probable that other states having similar problems will follow the example set by New York, New Jersey, and Connecticut. The consummation of interstate pollution compacts, however, is apt to be a slow process. It required nearly 5 years to have the Compact under consideration ratified. It would probably have taken considerably longer had it not been for the seriousness of the pollution which threatened the closing of bathing beaches used for the healthful recreation of millions of people each year in the metropolitan area and the destruction of millions of dollars worth of shore property.

There is a growing feeling among state health officials that the problem of controlling stream pollution is too big for the states to handle alone and there is an increasing demand for federal coöperation in the control of stream pollution and for federal aid in financing sewage disposal projects, especially where interstate streams and international boundary waters are involved. This is substantially the conclusion reached by the Special Advisory Committee on Water Pollution in its report to the National Resources Committee dated May 3, 1935. This committee recommended in part:

1. That powers and funds be granted to an appropriate federal agency to institute a coöperative program of investigation with legally constituted state agencies for such special studies as appear desirable, and particularly for the development of appropriate standards for water use and control.
2. That in order to stimulate the construction of pollution abatement works, funds for the purpose be made available by the federal government to local public and private agencies on a grant-in-aid or loan basis.

Although New York is one of the 8 states which have fairly satisfactory anti-pollution laws, trained personnel, and reasonably adequate funds for control of stream pollution, the progress made in the elimination of stream pollution was far from satisfactory until federal aid was made available for the financing of sewerage projects. This is evident when we consider the fact that

the population served by sewage treatment plants under construction or authorized with federal aid during the past 3 years is greater than the population served by all the treatment plants constructed between 1903 and 1933.

Considering the enormous funds that all of the municipalities in the state have expended for home and work relief during the past 4 years, very few, if any, will be able to undertake costly non-liquidating projects of this kind without federal aid.

In my opinion very few new sewage treatment plants will be constructed in New York State outside of the New York metropolitan area during the next 10 years unless such aid is provided, and I believe that the same will be true in the other states of the Union. Whatever our opinion may be regarding federal aid in financing local projects, the fact remains that unless such aid is forthcoming in the form of loans or grants there will be little progress in the elimination of stream pollution in the United States for a considerable time to come.

A Menace to Health

OBESITY, seldom in itself a serious health problem, seems to be a matter of great concern to many. Far too many of the obese seem willing to "try anything once" that offers an easy way to reduce weight. The great number of proprietary "fat reducers" offered to the public gives eloquent testimony of this.

During the war those engaged in the manufacture of explosives suffered much from various poisonings. It was noted that those exposed to dinitrophenol when poisoned, in addition to other symptoms, lost weight remarkably. In recent years an effort was made to use this chemical in a "safe" dosage, yet in sufficient amount to reduce weight.

The experience of the past two or three years should be enough to prove to the profession that it is very doubtful if there is any such thing as a "safe" dosage for this dangerous drug. The dangers attendant upon its use, even in the hands of physicians, are so great that its uncontrolled sale to the laity seems actually criminal. Canada has forbidden its sale except on a physician's prescription. Its sale is similarly restricted in England. Germany has issued official warnings as to its use. But in this country, if not "misbranded," it seems difficult to control its sale. It *will* accomplish reduction in weight, so technical "misbranding" is hard to prove. In Cleveland, only by mutual agreement among pharmacists, probably largely to protect themselves from possible damage suits, has sale of this drug in proprietary form been stopped. The Council on Pharmacy and Chemistry of the A.M.A. a year ago refused to include this drug in the N.N.R. for ample reasons given in its report.[1] . . .

The moral? Even if we have no law which can be invoked to protect the public in such cases as this, we owe it to ourselves as physicians to do all in our power to safeguard our patients from exposure to the hazards involved in the use of such dangerous drugs of such questionable value.—A. G. Cranch. *Bull. Acad. Med.* Cleveland, 10, 9 (Sept.), 1936.

REFERENCE

1. *J.A.M.A.*, 105:31 (July 6), 1935.

Need for Training Facilities for Public Health Personnel in the Western States*

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THE demand for personnel trained in the field of public health has seen a steady growth since the early part of the present century. Among the public health movements inaugurated during the first two decades of the century and which played important rôles in the development of the public health field as we now know it, may be mentioned the nation-wide fight against tuberculosis inaugurated by the National Tuberculosis Association; the inauguration of community nursing service by the American Red Cross; the hookworm campaigns carried out throughout the south by the Rockefeller Foundation, and studies and demonstrations in rural sanitation carried out by the U. S. Public Health Service with the view of controlling typhoid fever and kindred diseases through the improvement of environmental sanitation. Also, the conduct of mosquito eradication programs in the prevention of yellow fever and malaria may be mentioned as individually conducted public health programs to prevent specific diseases. Each of these individually conducted programs served an important part in bringing the people of the country to realize that public health is something which no progressive community should be without and without which no community can be expected to continue to progress.

With this realization on the part of the public there developed a new era in health administrative practice. Appropriations for state health departments increased to provide for the maintenance of sanitary engineering service to include the development of safe water supplies, the installation of sanitary sewerage systems, the improvement of housing conditions, etc., as engineering problems requiring technical training. The addition to state health organizations of divisions of epidemiology, industrial hygiene, and for the promotion of maternal and child hygiene, were developments within the present century which have increased the demand for public health personnel trained in the different branches of health work.

Out of this expansion of state health service there came the development of full-time local health departments organized to carry out intensive health promotional programs on a city, county, or district-wide basis. With this expansion of full-time local health service there was a still greater demand for health officers, nurses, and sanitary

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officers, but for whom no training facilities were available until after the World War.

Facilities for training nurses in public health work have been available in many states for a decade or more. Also the excellent public health schools organized at Hopkins, Harvard, and Yale a number of years ago have furnished trained public health officers, the most of whom have been placed in staff positions with our state departments of health. On the other hand, training facilities for supplying personnel for local health departments have not kept pace with the comparatively rapid development which has taken place in this field during recent years. As a result, our state health officers have been compelled to accept personnel for the administration of local health service who have been without either practical or theoretical training in health work. Many of these health workers have rendered excellent service, yet there are many others who have come into the public health field through the so-called " spoils system " which, unfortunately, is still being practised in many communities and doubtless will continue to be practised in the selection of health workers until health administration has reached that state of efficiency when positions in the field of public health will no longer be considered convenient berths for back-slapping vote-getters, or for the worthy aged who have spent long and active lives in other lines of endeavor. As health workers, we are therefore confronted with the obligation to bring public officials having appointive power to realize that executive and staff positions in the public health field are positions in which a very definite responsibility to the people is imposed. Until this is done the public health movement will continue to experience that lack of interest on the part of the lay public which will mean failure or, at best, very slow progress. Therefore, it should be the aim of every conscientious worker in the field of public health, also of every citizen who believes in the principles of preventive medicine, to overcome this far too prevalent attitude of indifference to efficiency which is met with in many appointive officers and their appointees.

Foreseeing the necessity for placing the public health field on a higher plane of efficiency, the Committee on Administrative Practice of the American Public Health Association several years ago recommended certain qualifications which should be required of personnel entering the field of public health. In 1935 the Committee on the Qualifications of Local Health Officers of the State and Territorial Health Officers Conference recommended certain qualifications which should be required by all state health officers of personnel entering public health work for the first time.

With funds allotted to provide for training personnel under the provisions of the Social Security Act, we now have an opportunity to bring into the public health field a group of workers who are basically better fitted to perform the duties which will be expected of them after they have received special training in their selected lines of public health work. If care is exercised—and certainly it should be exercised—in the selection of those nominated for public health training, and equal care is exercised by training centers in accepting students for matriculation, there is no question but that funds expended for this purpose will in the future return large dividends on the investment made for training public health workers. Not only will the individual receiving such training be equipped to render more efficient service in his special line of endeavor, but the whole public health movement will, within a few years, be given a stability which it has never before known.

On the other hand, there are many efficient public health workers who are now, and have for many years past, been engaged in public health work, and whose training has been confined to practical experience. They have attained success through hard work and the application of common sense principles to the solution of problems met with from day to day. This type of health worker has been largely responsible for progress made in the development of the nation-wide public health movement, and they should be given an opportunity to receive training under the provisions of the Social Security Act. Many of these workers are anxious for training and to meet this need, also the need for intensive training for those who are just entering the public health field, short courses are being organized to give intensive training over a period of 3 to 4 months, to health officers, public health nurses, and sanitarians. Such a school has been conducted at least once each year since 1927 at Vanderbilt University in Nashville, Tenn. Since funds became available under the Social Security Act, and in order to meet the demands for trained personnel, similar courses have recently been organized at the Universities of North Carolina, Michigan and Kentucky, for health officers and sanitary officers. Other short courses for public health nurses are being conducted by many public health nursing schools approved by the National Organization for Public Health Nursing.

In the far West we have ample facilities for training public health nurses at established public health nursing schools conducted by the Universities of California, Oregon, and Washington; but we have no permanently established facilities at the present time for giving intensive courses of training to health officers or sanitarians. Doubtless, such a school will be organized in connection with the University of California and will begin activities when the fall semester opens in August of this year. The school will be supported through tuition paid by the several states from Social Security funds and through a subsidy paid by the states on a per capita basis or by a subsidy paid by the U. S. Public Health Service to the school concerned through the state department of health of the state in which the school will be located. Plans are now under way for the organization of this school. That such a school, organized in the far West to serve the West, is urgently needed, is apparent for several reasons:

1. There are no training schools west of the Mississippi to which health officers or sanitarians may be sent for intensive short courses, and there is no school from which certificates in public health or degrees in public health may be obtained by medical officers who desire to take a course of training over one or more years.

2. There are many public health problems peculiar to the western states which do not exist as problems in the eastern states. Where the control of typhoid fever or the dysenteries or hookworm is a problem of first importance to the public health worker of Alabama, or Mississippi, or West Virginia, the control of Rocky Mountain spotted fever or tularemia is of equal importance to the health worker of Montana, or Idaho. Also, it is just as important that a health department in California be in a position to carry out or to direct rodent control measures as a means of preventing outbreaks of bubonic plague as it is for a health department in Louisiana or Florida to be engaged in mosquito eradication measures as a means of controlling malaria. Proper supervision of the great canning industry on the Pacific Coast is an important duty of the sanitarian of that area, whereas that particular phase of public health work is, by way of comparison, of minor importance to the sanitarian of the New England States. Thus we see the principal problems of the public health worker of the far West are in a sense peculiar to the far West, and for that reason if for no other reason, training facilities are urgently needed in the western part of the country to serve the western states.

3. On the other hand, let us consider the demand for trained public health workers in

the western states. The 11 western states comprising the 5th Engineering District of the U. S. Public Health Service, including New Mexico, Colorado, and Wyoming, and all states west to the Pacific Coast, cover a total area of more than 1,178,000 square miles and had a total population of less than 12 million people in 1930, or an average of only about 10 people to the square mile. This within itself is a problem peculiar to the western states. The land area of the largest county in each of these states varies from 4,800 square miles in Colorado to more than 20,000 square miles in California, with both Arizona and Nevada having counties with land areas above 18,000 square miles. Of the total of 400 counties in the 11 far western states, 42 have an area of more than 5,000 square miles; 38 have a population of 1 or less per square mile; 194 have a population of 5 or less per square mile, and in the entire area exclusive of California there are only 74 towns or cities having a population of over 10,000. Obviously these sparsely settled counties cannot individually afford now, nor will many of them ever be able to afford the maintenance of adequate health service.

PRESENT STATUS OF FULL-TIME COUNTY HEALTH SERVICE

In the entire area at the present time only 37 of the 400 counties are maintaining full-time county health service organized to serve the people of individual counties. In the state of New Mexico, however, 10 health districts have recently been established to provide a minimum health service to the people of all counties of that state. By the establishment of these districts under a state law providing that all counties must financially participate in the maintenance of a local health service as a part of one of the 10 districts set up under the state law, New Merico has taken the lead of all states in the West, if not in the entire nation, in solving the problem of furnishing a full-time and reasonably adequate health service to the people of the most remote areas as well as to the people of the more thickly populated areas of the state. While it is impossible to mention the details of the New Mexico District Health Law in this paper, other states contemplating the organization of local health service for sparsely settled counties would do well to look carefully into the law under which the district health service is being administered in New Mexico.

FUTURE DEVELOPMENT

By a recent survey of the 11 western states we are advised that plans have been completed for the establishment of 22 full-time county health units which will serve individual counties and will become operative as soon as trained personnel is available. Also, plans are under way for the organization of 37 new health districts which will furnish full-time health service to 103 counties. In several states it is expected that these district health units will in the beginning be maintained entirely from state funds or from federal funds made available to the states. In some instances it is planned that the counties comprising each district will be required to assume, according to population, their proportionate share of 10 per cent of the maintenance cost of the district after the first year and an additional 10 per cent each year thereafter until at least 50 per cent of the total cost is borne from local funds. Where legislation does not require local financial participation it is believed that this or some similar method will be the only means by which reasonably adequate health service can be furnished for the sparsely settled counties of the West.

To furnish needed personnel for new county or district health departments, now planned but not in operation, will require, by conservative estimate, more than 200 public health nurses, approximately 60 health officers, and at least 100 sanitary officers or sanitary engineers for local health departments. There will in addition be needed a considerable number of trained laboratory

technicians and at least some clerks trained in vital statistics work. County health units now established are already beginning to increase their personnel, and it is expected from the established units there will be an additional demand upon training centers for refresher courses for personnel now employed as well as for training personnel to be later employed.

In conclusion, I am pleased to say that the attitude of the state health officers of the far western states in the matter of selecting only the best trained personnel available for positions in both state and local organizations, has been particularly encouraging. So far, I know of no instance where staff positions in state health organizations have been filled by personnel untrained or inexperienced in the particular line of work to which they have been appointed.

On the other hand, however, I do know of a number of positions which are as yet unfilled because qualified personnel is not available. In some instances state health officers who formerly were compelled to approve for local public health positions inexperienced personnel recommended by local officials, have refrained from filling these positions or have refused to start local health departments which might now be under way except for a lack of suitable personnel.

This attitude is one which is highly commendable and which if continued will prove in the long run to be of inestimable value to the public health movement from both a state and a national standpoint. It is far better that the states carry over unexpended funds from one year to another, or if necessary return unexpended balances to the state or United States treasuries than it is to expend local, state, or federal money for so-called health service which will prove to be a discredit rather than a credit to the state public health programs. In other words, the public health leaders of the country are, in a sense, "on the spot." With the wise expenditure of funds made available for public health work under the provisions of the Social Security Act, and from local sources, there is every reason to believe that the public health movement will rapidly expand to serve a much greater proportion of the total population of the country, and that health work in general will advance in the esteem of the public at large.

It remains to be seen how effectively these funds will be expended, and it is certain that no portion of your Social Security allotment can be more efficiently expended than in providing, in so far as it is possible to do so, the best available training for those who are now or are expected to be placed in public health positions.

Better training for all classes of health workers means greater efficiency and, in the long run, efficiency will prove to be the best sort of politics. Anyhow, upon our ability to get the greatest possible return upon the investment made in public health promotional work will depend the continued support of our federal, state, and local governments.

Staphylococcus Bacteriophage Toxoid

An Improved Staphylococcus Antigen

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THE soluble exotoxin of *Staphylococcus pyogenes* is converted easily into toxoid. Active immunity in laboratory animals and in human beings may be produced by injection of this toxoid. The endotoxin of the staphylococcus, however, though it is probably an important factor in staphylococcus infections, has received little attention of late.

The antitoxin produced by the immunization of horses with staphylococcus toxoid and toxin is used in generalized staphylococcus infections. However, in certain cases of staphylococcemia in adults and adolescents, the administration of antitoxin, even intravenously, was of no effect.[1] The failure of the antitoxin to exert a favorable influence has been explained by the undue delay which frequently takes place before the correct diagnosis can be made. Upon the probable assumption that the mechanism of action of staphylococcus antitoxin in systemic staphylococcus infections is analogous to that of diphtheria antitoxin in diphtheria, it has been suggested that the staphylococcus antitoxin, due to the delay in its administration, is unable to repair the damage already done.

While these explanations no doubt are correct in many cases, some importance also may be ascribed to the absence of antibacterial antibodies in the staphylococcus antitoxin used. For instance, it is not impossible that a lack of bacterial antigen in the toxoid underlies failure of response to toxoid injections in some refractory cases of localized staphylococcus infection. Furthermore, clinical experience has been encouraging with antibacterial serums produced by the immunization of horses with live, killed, or lysed microörganisms, such as pneumococci, meningococci, and streptococci.

The therapy in different infections should not be based too closely upon existing analogies in certain directions, but all the pertinent factors, especially when dissimilarities exist, should receive due consideration. Just because the diphtheria bacillus and *Staphylococcus pyogenes* both produce an exotoxin, it does not necessarily follow that the activity of the two organisms is equally well neutralized by their specific antitoxins. If the invasiveness of the organisms, as in this case, happens to be very different, as shown by the extremely rare findings of diphtheria bacilli in the blood stream or cerebrospinal fluid,[2] in contrast with the relatively frequent occurrence of staphylococcemia and staphylococcus meningitis, prophylactic and therapeutic preparations should be made and administered with this difference in view.

Staphylococcus vaccines, stock and autogenous, have been used for a long time in the prophylaxis and treatment of localized staphylococcus infections;

and in a proportion of the cases they have proved of definite value. Staphylococcus bacteriophage is still used, although less extensively than a few years ago, and of late staphylococcus toxoid has been employed successfully. Since vaccines, bacteriophage solution and toxoid embody, as a group, the endo- and exotoxic antigens of *Staphylococcus pyogenes*, the character of the immunity produced by each of these therapeutic agents is probably distinctive. If, now, an antigen could be prepared which contained both endo- and exotoxic principles, the immunity produced should be more complete and presumably more effective than a strict antibacterial immunity or a specific antitoxin immunity.

Furthermore, if the antitoxin used in the treatment of general systemic staphylococcus infections also contained antibacterial antibodies, the administration of such a preparation would be more in accordance with the known characteristics of *Staphylococcus pyogenes* than the use of the specific antitoxin alone. These considerations have prompted an attempt to prepare a staphylococcus toxoid which would contain endotoxic as well as exotoxic principles of lysed staphylococci from many different strains.

Several methods for lysis of bacteria are available, but lysis by bacteriophage seemed the most promising, since bacteriophage solutions contain all the bacterial proteins set free by lysis. By this method denaturation by heat or by other treatment is avoided, and the endo-antigens liberated are presumably more like the bacterial elements arising from parenteral digestion of staphylococci which have invaded the host. The bacteriophage solutions may therefore be considered "super vaccines" containing all the chemical constituents of the staphylococci.[3] Larkum states,[4] that staphylococcus bacteriophage is an antigen of toxoid character, since it is devoid of hemolytic and dermonecrotic activity, is innocuous to rabbits, and will produce antitoxin which neutralizes the toxic properties of staphylococcus toxin.

EXPERIMENTAL

In order to avoid dilution of both the toxoid and the bacteriophage solution of the staphylococci, if a mixture of these products were prepared, the bacteriophage solution should either be made in the toxin for later conversion into toxoid, or the toxin should be made, using the bacteriophage solution as a medium. Bacteriophage solution could not be made in the toxoid owing to the presence of formalin. Since toxin production, however, was much inferior when prepared in bacteriophage solution as compared to the regular medium, whereas good growth, with subsequent clearing with bacteriophage, was obtained in staphylococcus toxin, the following steps were fixed upon for the preparation of this polyvalent staphylococcus antigen:

1. Preparation of the staphylococcus toxin, as described below
2. Berkefeld filtration of the toxin
3. Inoculation of the Berkefelded toxin with a pooled culture of six different strains of staphylococci together with an adapted staphylococcus bacteriophage
4. Centrifugation, if necessary, after clearing of the culture by the bacteriophage
5. Addition of formalin and merthiolate
6. Incubation for conversion of the toxin into toxoid, and for detoxification of possible endotoxins
7. Berkefeld filtration and testing for innocuity and antigenicity in the usual manner

PREPARATION OF STAPHYLOCOCCUS TOXIN

The staphylococcus toxin was prepared according to the method previously described by Leonard and Holm,[5] and had a strength of 3,000 m.h.d. and 2,500 m.d.n.d. per c.c., while 0.25 c.c. injected intravenously killed rabbits weighing 2.1 kg. in 3 minutes.

PREPARATION OF ADAPTED BACTERIOPHAGE

Staphylococcus bacteriophage, as prepared at the Squibb Biological Laboratories, was active toward all the pathogenic strains of staphylococci used in this work—but to different degrees. Four strains of *Staphylococcus aureus* and two of *Staphylococcus albus* were employed. By serial transfers over about 2 months the bacteriophage was adapted to such an extent that a dilution of 10^{-6} cleared a culture when incubated 24 hours at 37° C. and another 24 hours at room temperature.

PREPARATION OF BACTERIOPHAGE TOXOID

After Berkefeld filtration of the toxin, it was divided into three parts, of which one part served as a control, the second was converted into bacteriophage toxoid, while the third part was made into staphylococcus toxoid.

One liter of the toxin was inoculated with 1 c.c. of undiluted pooled staphylococcus culture and with 1 c.c. of a 1:1,000,000 dilution of the adapted bacteriophage; subsequent incubation took place for 24 hours at 37° C. and for 24 hours at room temperature. The staphylococcus cultures were the same strains which had previously been employed in the preparation of the toxin. Growth was profuse, and partial clearing started 7 hours after inoculation. After the incubation at room temperature, the liquid was perfectly clear and centrifugation consequently was not necessary. Hemolytic and dermonecrotic tests showed that no diminution of toxicity had taken place. Controls were made with untreated toxin similarly incubated. To untreated toxin and bacteriophage toxin was added formalin to make a concentration of 0.35 per cent and merthiolate to 1:10,000. The bottles were placed in the incubator at 37° C. for 17 days, when detoxification was complete. The usual tests for innocuity [5] were made on these final products. Since staphylococcus bacteriophage toxoid contains both endo- and exotoxic principles in solution, the combined antigen may be designated Ambo-toxoid.

The principle outlined for the preparation of the improved staphylococcus antigen, might be utilized also with other microörganisms which produce both exotoxin and endotoxin. In this manner it may be possible to obtain more effective antigens, both for active immunization of human beings, and also for the production of more potent antibodies in the horse or other animals.

IMMUNIZATION OF RABBITS

By animal inoculations the antigenic potency of staphylococcus bacteriophage toxoid was compared with that of toxoid derived from the same staphylococcus toxin, and with that of a fresh bacteriophage solution prepared in the same medium that had served for the production of the bacteriophage toxin. These preparations were tested in three experiments on different lots of rabbits.

Experiment 1—Fifteen albino rabbits, ranging in weight from 2,700 to 3,100 gm., were bled from the marginal ear vein, and the serum of each was tested by the hemolytic method for presence of "natural staphylococcus antitoxin." Lots of 5 rabbits were injected intravenously with 3 c.c. respectively, of staphylococcus toxoid, bacteriophage toxoid, and of bacteriophage solution. One week later the rabbits were bled, the serum was tested for staphylococcus antitoxin, and the animals were reinjected with 5 c.c. of their several preparations. After 1 more week a final bleeding was taken, and the serum again was tested for staphylococcus antitoxin. The results are recorded in Table I.

If rabbit No. 86 in Table I is eliminated on account of an initial high "normal" antitoxin titer, and if rab-

TABLE I

COMPARATIVE VALUES FOR ANTITOXIN PRODUCTION IN ALBINO RABBITS, AFTER INTRAVENOUS INJECTIONS OF STAPHYLOCOCCUS TOXOID, OF BACTERIOPHAGE TOXOID, AND OF BACTERIOPHAGE SOLUTION

Intravenous Injections

Staphylococcus Toxoid				*Bacteriophage Toxoid*				*Bacteriophage Solution*			
	Units of Staph. Antitoxin				*Units of Staph. Antitoxin*				*Units of Staph. Antitoxin*		
Rabbit No.	*Before Immunization*	*One Week After 1st Injection*	*One Week After 2d Injection*	*Rabbit No.*	*Before Immunization*	*One Week After 1st Injection*	*One Week After 2d Injection*	*Rabbit No.*	*Before Immunization*	*One Week After 1st Injection*	*One Week After 2d Injection*
89	0.06	0.96	2.0	84	0.04	0.64	7.0	79	0.04	0.64	0.64
88	0.06	1.6	d.	83	0.06	0.08 (Sick)	0.64 (Sick)	78	0.04	0.16	....
87	0.04	0.64	2.0	82	0.08	0.32	4.0	77	0.08	0.16	0.32
86	1.28	>12.0	>12.0	81	0.04	0.08	3.0	76	0.06	0.16	0.16
85	0.08	0.48	2.0	80	0.06	0.16	4.0	75	0.08	0.64	1.28

TABLE II

COMPARATIVE VALUES FOR ANTITOXIN PRODUCTION IN BROWN RABBITS, AFTER INTRAVENOUS INJECTIONS OF STAPHYLOCOCCUS TOXOID, OF BACTERIOPHAGE TOXOID AND OF BACTERIOPHAGE SOLUTION TOGETHER WITH RESULTS OF SUBSEQUENT INTRAVENOUS INJECTIONS OF THE IMMUNIZED RABBITS WITH LIVE, VIRULENT STAPHYLOCOCCI

Intravenous Injections

Staphylococcus Toxoid					*Bacteriophage Toxoid*					*Bacteriophage Solution*				
	Units of Staph. Antitoxin					*Units of Staph. Antitoxin*					*Units of Staph. Antitoxin*			
Rabbit No.	*Before Immunization*	*One Week After 1st Inj.*	*One Week After 2d Inj.*	*5 Billion Organisms Injected 2 Weeks After 2d Inj.*	*Rabbit No.*	*Before Immunization*	*One Week After 1st Inj.*	*One Week After 2d Inj.*	*5 Billion Organisms Injected 2 Weeks After 2d Inj.*	*Rabbit No.*	*Before Immunization*	*One Week After 1st Inj.*	*One Week After 2d Inj.*	*5 Billion Organisms Injected 2 Weeks After 2d Inj.*
7	0.16	7	9	Survived *	12	0.16	..	5	Survived	17	0.04	0.08	0.08	d. 88 h.
8	0.04	3	9	d. 44 h.	13	0.04	..	11	d. 44 h.	18	0.04	0.32	1.26	....
9	0.16	4	5	d. 7 days	14	0.16	9	13	Survived	19	0.08	0.16	1.26	....
10	0.04	0.16	4	d. 44 h.	15	0.06	5	13	d. 20 h.	20	0.04	0.08	0.08	d. 20 h.
11	0.04	3	5	d. 70 h.	16	0.04	5	9	d. 44 h.	21	0.08	0.64	0.64	d. 7 days

* Sick 7 days; died 9 days.

bits Nos. 78, 83, and 88 in the same table are disregarded on account of intercurrent disease, it seems evident that the bacteriophage toxoid rabbits showed a considerably better immunity response than the rabbits injected either with staphylococcus toxoid or with bacteriophage solution. The average antitoxin titers, if rabbits Nos. 86 and 83 are eliminated, are 2 units per c.c. of serum from the animals immunized with staphylococcus toxoid, 4.5 units for the rabbits injected with bacteriophage toxoid, and 0.85 units for the animals with bacteriophage solution.

Experiment 2—The rabbits were 15 brown animals, weighing from 2,100 to 2,400 gm. This was a duplicate of Experiment 1, except that 1 week after the last bleeding each animal received an intravenous injection of 5 billion staphylococci from a 16 hour pooled broth culture of the same virulent strains used throughout this study. The results, collected in Table II, are of the same order as those of Table I in that the highest antitoxin titer occurred in the serum from rabbits immunized with bacteriophage toxoid. The mean titer for this group was 10 units, for the toxoid group 6.2 units, and for the bacteriophage group 0.66 units of antitoxin per c.c. of serum.

It has been claimed that resistance in bacteremias caused by the staphylococcus depends upon the titer of serum antitoxin, but other factors may also be of importance as indicated by the results of the intravenous injections of live virulent staphylococci into the immunized animals of this group. Although the rabbits immunized with staphylococcus toxoid all showed considerable antitoxin production, none of them survived 10 days after the injection of the live organisms. Of the bacteriophage toxoid rabbits, No. 12, with 5 units, and No. 14, with 13 units of antitoxin survived, while the 3 other animals with 13, 11, and 9 units respectively, died. But of the animals injected with bacteriophage solution, which exhibited only a negligible capacity to excite antitoxin production, one rabbit, with only 0.08 units of circulating antitoxin per c.c. of serum, survived injection of the live culture for 3½ days, while another rabbit, with 0.64 units of antitoxin, survived 7 days.

Experiment 3—In this experiment 30 gray rabbits, weighing from 2,200 to 2,600 gm., were immunized in the same manner as in the other two experiments. Two of the animals died from intercurrent disease early in the test. In order further to test the supposition that circulating antitoxin is not a measure of resistance against live virulent staphylococci, the 28 survivors were injected intravenously, 1 week after the last bleeding, with 5 billion staphylococci from a 16 hour pooled broth culture of the same virulent strains that had been used in all of the previous experiments. The results are given in Table III.

As in the first two experiments the antitoxin titers are considerably higher for the rabbits injected with bacteriophage toxoid, than for the animals that were injected with staphylococcus toxoid or with bacteriophage solution, the group averages being respectively 6.9, and 4.0, and 0.49 units. The intravenous injection of the 5 billion virulent staphylococci caused the death in 72 hours or less of all rabbits immunized with staphylococcus toxoid, irrespective of antitoxin titer, while 6 out of 9 rabbits survived in the bacteriophage toxoid group, and 3 out of 9 animals survived in the bacteriophage solution group.

When the data for the 3 experiments are combined, it is found that the mean antitoxin titers of 18 rabbits, after inoculation with the 3 antigens were: staphylococcus toxoid, 4.3 units; bacteriophage toxoid, 7.3 units, and bacteriophage solution, 0.56 units.

TABLE III

COMPARATIVE VALUES FOR ANTITOXIN PRODUCTION IN GRAY RABBITS, AFTER INTRAVENOUS INJECTIONS OF STAPHYLOCOCCUS TOXOID, OF BACTERIOPHAGE TOXOID AND OF BACTERIOPHAGE SOLUTION TOGETHER WITH RESULTS OF SUBSEQUENT INTRAVENOUS INJECTIONS OF THE IMMUNIZED RABBITS WITH LIVE, VIRULENT STAPHYLOCOCCI

Intravenous Injections

Staphylococcus Toxoid

Rabbit No.	*Units of Staph. Antitoxin* Before Immunization	One Week After 1st Inj.	One Week After 2d Inj.	5 Billion Organisms Injected 2 Weeks After 2d Inj.
97	0.16	>1.28	18	d. 72 h.
34	0.16	>1.28	6	d. 48 h.
35	<0.04	0.08	0.64	d. 48 h.
36	<0.04	0.16	4	d. 48 h.
37	<0.04	0.32	1.28	d. 48 h.
38	<0.04	0.16	1.28	d. 24 h.
39	<0.04	0.08	2	d. 48 h.
40	<0.04	0.16	4	d. 48 h.
41	<0.04	0.08	1.50	d. 48 h.
42	<0.04	0.08	1.50	d. 48 h.

Bacteriophage Toxoid

Rabbit No.	*Units of Staph. Antitoxin* Before Immunization	One Week After 1st Inj.	One Week After 2d Inj.	5 Billion Organisms Injected 2 Weeks After 2d Inj.
23	0.32	>1.28	10	d. 48 h.
24	<0.04	>1.28	6	Survived
25	0.32	....	..	....
26	<0.04	0.64	4	Survived
96	<0.04	0.16	1.28	Survived
28	<0.04	0.64	6	Survived
29	<0.04	0.16	5	d. 24 h.
30	0.16	>1.28	20	Survived
31	<0.04	0.16	6	Survived
32	<0.04	>1.28	4	d. 48 h.

Bacteriophage Solution

Rabbit No.	*Units of Staph. Antitoxin* Before Immunization	One Week After 1st Inj.	One Week After 2d Inj.	5 Billion Organisms Injected 2 Weeks After 2d Inj.
44	<0.04	0.08	0.08	d. 24 h.
45	<0.04	0.04	0.08	d. 72 h.
46	0.16	0.32	0.32	Survived
47	<0.04	0.16	1.50	Survived
48	0.16	0.32	1.28	d. 72 h.
49	0.04	0.04	0.04	d. 72 h.
50	0.32	0.32	0.64	d. 24 h.
51	0.04	0.32	0.32	Survived
52	0.04	0.08	0.16	d. 24 h.
43	<0.04	....	....	....

Of 15 rabbits which were injected with live, virulent staphylococci after their inoculations with staphylococcus toxoid, none survived more than 9 days, while 11 died within 48 hours. Of 14 rabbits immunized with bacteriophage toxoid, 8, or 55 per cent, survived the later staphylococcus injection. Finally, of 12 rabbits inoculated with bacteriophage solution, 3, or 25 per cent, withstood the injection of live staphylococci.

SUMMARY

1. A staphylococcus toxin containing lysed microörganisms was prepared by inoculating a staphylococcus toxin after passage through Berkefeld filter with bacteriophage and a staphylococcus culture. After lysis the resulting bacteriophage toxin was converted into toxoid by formalin and incubation at 37° C. as in the production of staphylococcus toxoid. The bacteriophage toxoid was tested for innocuity, and its antigenicity was compared to that of staphylococcus toxoid and of bacteriophage solution.

2. The antitoxin titers of rabbits immunized with the bacteriophage toxoid were consistently higher than the titers resulting from the immunization by staphylococcus toxoid or bacteriophage solution.

3. Intravenous injection of two-thirds of the immunized rabbits each with 5 billion live virulent staphylococci was fatal to all of the animals immunized with staphylococcus toxoid, whereas 55 per cent of the animals injected with bacteriophage toxoid survived, as did 25 per cent of the animals injected with bacteriophage solution.

4. Survival of immunized animals that have been injected later with live virulent staphylococci apparently does not depend upon the amount of serum antitoxin present.

5. It is probable that the procedure outlined above for the preparation of bacteriophage toxoid may be utilized with other microörganisms, especially those that yield endo- as well as exotoxins, and which may be lysed by bacteriophage. Thus it should be possible to obtain more effective antigens for active immunization of human beings, as well as for the production of more potent antibodies in the horse or in other animals.

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Diphtheria Immunization in Newark, N. J.

HEALTH PROGRESS[1] for September, 1936, gives a very interesting report on the control of diphtheria by immunization in Newark, N. J. Toxin-antitoxin was supplied free as early as 1922, and by 1926, somewhere between 10 and 20 per cent of school children and a smaller proportion of preschool children had been immunized. In 1926 there were 409 cases with 21 deaths, whereas for 11 years previously there had been an average of 1,000 cases and 50 deaths per year. There were still from 70,000 to 80,000 unprotected school and preschool children, and in 1927 an upward swing took place, with 696 cases and 62 deaths; 1,364 cases with 95 deaths in 1928; and 1,717 cases with 96 deaths in 1929. An active campaign was begun, and by 1930, 80 per cent complete immunizations had been done. At present 95 per cent of the children have been immunized, and in some schools, 100 per cent immunization has been reached.

The results are striking and inspiring. In 1930, cases and deaths dropped to 873 and 47 respectively. In 1931 there were only 223 cases with 16 deaths; in 1932, 70 cases, with 2 deaths; and in the 3 succeeding years, 21, 10, and 12 cases respectively, with 1 death for each year. In the most recent 2 full years there have been 18 cases only with 1 death. This is a wonderful record for immunization, and should inspire other health officers to pursue this line of protection.—M.P.R.

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Expenditures in Certain Cities for Selected Health Services

THE cities entered in the Health Conservation Contest compete with each other in 6 groups based on population. These groupings are retained in the table below.

The data contained in this table have been compiled by the Sub-Committee on Current Health Department Practices of the Committee on Administrative Practice of the American Public Health Association. The information has been obtained from schedules submitted in the annual City Health Conservation Contests. The per capita expenditures are based on 1930 U. S. Census Bureau population figures for each of the 6 years portrayed.

The health services covered include: Administration; Vital Statistics; General Sanitation; Milk, Meat and other Food Control; Acute Communicable Diseases; Tuberculosis Control; Venereal Disease Control; Child Hygiene including Maternal, Infant, Preschool, and School Hygiene; Public Health Nursing, and Laboratory Services.

All expenditures for hospitalization, institutional care, medical relief, garbage collection and disposal, and capital expenditures and deficits have been *excluded*. In school hygiene, board of education expenditures for medical school inspection and school nursing have been *included* while expenditures for physical education and health instruction by teachers have not.

NOTE: This article is based on the Report of the Sub-Committee on Current Practices of Health Departments of the Committee on Administrative Practice. The members are: Joseph W. Mountin, M.D., *Chairman*, E. L. Bishop, M.D., Henry F. Vaughan, Dr.P.H., Allen W. Freeman, M.D., George T. Palmer, Dr.P.H., John L. Rice, M.D., W. Frank Walker, Dr.P.H., and C. M. Derryberry, Ph.D.

REPORTED PER CAPITA EXPENDITURES (IN CENTS) FOR SELECTED HEALTH SERVICES BY OFFICIAL AGENCIES ACCORDING TO POPULATION GROUPS FOR THE SIX YEAR PERIOD—1930–1935

Population Group I *	*1930*	*Official Per Capita Expenditures (in cents)*					
City	*Population*	*1930*	*1931*	*1932*	*1933*	*1934*	*1935*
Baltimore, Md.	804,874	91.3	....	74.9	64.4	70.6	74.0
Buffalo, N. Y.	573,076	98.9	95.1	93.0	87.8	82.3	85.1
Chicago, Ill.	3,376,438	....	97.8	85.6	71.3	....	....
Detroit, Mich.	1,568,662	116.4	120.2	97.7	76.8	85.8	94.8
Los Angeles, Calif.	1,238,048	....	56.9	57.0	54.0	49.2	....
Milwaukee, Wis.	578,249	101.7	108.2	107.9	98.9	89.5	95.2[1]
New York, N. Y.	6,930,446	....	....	....	....	....	60.0
Philadelphia, Pa.	1,950,961	60.9	61.0	....	....	....	....
Pittsburgh, Pa.	669,817	91.9	110.8	87.1	64.5	104.3	99.0
St. Louis, Mo.	821,960	63.4	67.7	60.3	52.8	54.7	....

* Group I—Cities of over 500,000 population

1. Exclusive of WERA.

Population Group II * City	1930 Population	Official Per Capita Expenditures (in cents) 1930	1931	1932	1933	1934	1935
Akron, Ohio	255,040	58.9	57.9	46.0	37.7	36.1	37.7
Atlanta, Ga.	270,366	53.1	55.4	88.6	86.2	126.3	....
Cincinnati, Ohio	451,160	54.8	64.7	53.4	51.6	....	....
Dallas, Tex.	260,475	56.4	52.8	64.6	61.5	51.0	52.9
Denver, Colo.	287,861	92.8	93.8	62.2	....	....	....
Houston, Tex.	292,352	76.4	70.5	39.4	38.6	54.5	36.4
Kansas City, Mo.	399,746	87.1	86.3	78.0	67.1	....	....
Louisville, Ky.	307,745	....	64.0	49.1	51.0	51.6	53.0
Minneapolis, Minn.	464,356	61.9	63.2	63.7	60.7	61.5	56.6
Memphis, Tenn.	253,143	77.4	80.9	....	....	62.7	68.2
Newark, N. J.	442,337	160.8	169.7	155.3	144.9	145.4	146.2
New Orleans, La.	458,762	54.1	56.8	52.0	48.9	46.3	....
Oakland, Calif.	284,063	....	93.0	92.5	75.9	95.6	100.2
Portland, Ore.	301,815	53.0	54.8	52.0	43.3	40.3	....
Rochester, N. Y.	328,132	110.0	110.0	86.0	96.5	....	....
San Antonio, Tex.	231,542	41.9	27.7	....	....	....	....
St. Paul, Minn.	271,606	39.2	40.6	....	....	....	....
Toledo, Ohio	290,718	76.7	59.3	51.6	47.3	63.2	73.3
Washington, D. C.	486,869	104.5	110.1	107.5	99.9	95.2	106.7

Population Group III * City	1930 Population	Official Per Capita Expenditures (in cents) 1930	1931	1932	1933	1934	1935
Albany, N. Y.	127,412	....	149.0	154.7	67.7	143.5	65.0
Chattanooga, Tenn.	119,798	52.4	52.4	....	....	32.2	....
Dayton, Ohio	200,982	60.7	59.8	46.1	47.1	47.2	....
Des Moines, Iowa	142,559	60.3	33.8	33.6	....	42.4	46.5
Duluth, Minn.	101,463	56.7	53.4	52.6	40.0	38.5	62.8
Erie, Pa.	115,967	77.2	85.4	71.3	80.4	75.5	81.4
Evansville, Ind.	102,249	....	....	....	....	67.8	48.7
Flint, Mich.	156,492	96.6	90.8	64.9	67.5	50.0	54.5
Fort Wayne, Ind.	114,946	....	....	....	....	36.2	35.6
Fort Worth, Tex.	163,447	104.4	110.3	78.4	70.2	75.5	81.1
Grand Rapids, Mich.	168,592	68.6	66.0	84.7	61.8	64.4	58.6
Hartford, Conn.	164,072	59.6	142.5	62.5	108.4	145.4	130.1
Kansas City, Mo.	121,857	35.4	36.2	....	....	....	....
Knoxville, Tenn.	105,802	64.3	61.2	52.7	47.2	44.6	50.2
Long Beach, Calif.	142,032	....	....	....	33.0	....	....
Lynn, Mass.	102,320	49.1	55.7	50.9	49.7	54.4	54.8
Nashville, Tenn.	153,866	77.4	93.3	99.9	....	82.3	....
New Haven, Conn.	162,655	111.1	111.0	102.8	91.9	93.1	96.8
Norfolk, Va.	129,710	46.6	66.9	49.6	49.9	43.2	....
Omaha, Nebr.	214,006	42.4	19.8	38.0	33.9	....	....
Peoria, Ill.	104,969	36.5	36.3	76.3	28.1	48.9	52.6
Reading, Pa.	111,171	72.1	81.2	84.5	82.5	82.2	87.0
Salt Lake City, Utah	140,267	84.8	74.8	47.5	61.0	60.7	54.7
South Bend, Ind.	104,969	25.4	22.8	31.1	22.5	25.6	23.0
Spokane, Wash.	115,514	57.8	45.1	43.6	....	....	....
Springfield, Mass.	149,900	77.0	87.3	83.1	76.0	76.2	86.8
Syracuse, N. Y.	209,326	145.3	167.2	121.8	128.9	135.7	124.1
Tacoma, Wash.	106,817	43.7	....	81.6	68.0	39.1	51.3
Tampa, Fla.	101,161	71.3	76.7	67.6	65.6	64.5	69.4
Utica, N. Y.	101,740	95.1	110.4	83.2	118.4	171.1	73.0
Wilmington, Del.	106,597	21.2	....	....	21.1	....	....
Yonkers, N. Y.	134,646	....	....	....	....	133.6	111.4

* Group II—Cities of 250,000 to 500,000 population
" III—Cities of 100,000 to 250,000 population

Population Group IV * *City*	*1930 Population*	*Official Per Capita Expenditures (in cents)* 1930	1931	1932	1933	1934	1935
Augusta, Ga.	60,342	104.1	....	103.5	....	92.3	....
Austin, Tex.	53,120	60.4[2]	60.8[2]	....	....	34.9[3]	38.8[3]
Beaumont, Tex.	57,732	46.9	25.4	19.9	27.9	27.9	....
Binghamton, N. Y.	76,662	57.3	59.7	112.3	....	100.6	98.7
Charleston, S. C.	62,265	93.8	81.0	64.3	99.2	....	....
Charleston, W. Va.	60,408	67.5	54.6	53.4	44.7	31.9	55.3
Decatur, Ill.	57,510	67.8	68.8	58.5	48.9	117.8	....
East Orange, N. J.	68,020	69.4	70.3	68.6	59.6	50.5	58.7
Evanston, Ill.	63,338	99.9	109.6	91.2	....	34.9	37.6
Fresno, Calif.	52,513	68.9	55.8	51.0	....	....	....
Greensboro, N. C.	53,569	74.6	53.5	45.3	49.3	53.4	49.6
Hamilton, Ohio	52,176	58.9	59.8	....	....	....	....
Harrisburg, Pa.	80,339	82.7	89.0	....	....	....	....
Kalamazoo, Mich.	54,786	....	120.7	122.6	123.8	97.1	73.1
Kenosha, Wis.	50,262	107.9	125.5	....	....	....	....
Lakewood, Ohio	70,509	84.5	86.8	80.7	....	39.8	....
Lansing, Mich.	78,397	....	....	....	....	32.4	34.6
Lincoln, Nebr.	75,933	57.2[4]	60.5[4]	71.7[4]	51.4[4]	140.1	115.9
Macon, Ga.	53,829	59.8	62.0	55.8	....	....	....
Malden, Mass.	58,036	....	....	....	155.4	....	....
New Britain, Conn.	68,128	58.5	....	....	....	....	....
New Rochelle, N. Y.	54,000	....	....	....	....	89.1	88.7
Pasadena, Calif.	76,086	73.1	80.5	120.8	105.4	115.0	111.2
Portland, Me.	70,810	68.7	56.3	67.5	61.4	65.2	....
Pontiac, Mich.	64,928	129.2	114.4	87.4	49.8	46.2	....
Pueblo, Colo.	50,096	47.3	44.0	40.8	35.2	35.3	42.4
Quincy, Mass.	71,983	....	....	....	....	65.6	63.1
Racine, Wis.	67,542	99.1	83.2	79.6	63.7	71.7	71.3
Roanoke, Va.	69,206	32.8	31.3	36.5	35.6	28.0	....
Rockford, Ill.	85,864	32.9	30.1	22.7	21.5	38.9	....
Sacramento, Calif.	93,750	93.1	89.4	104.0	106.3	140.8	111.2
San Jose, Calif.	57,651	56.7	52.5	47.0	45.1	44.4	44.7
Saginaw, Mich.	80,715	76.3	80.7	....	....	35.6	37.6
Schenectady, N. Y.	95,692	147.6	143.6	188.8	144.7	146.0	157.0
Shreveport, La.	76,655	49.2	....	....	....	....	....
Springfield, Ohio	68,743	42.3	42.2	....	....	....	....
St. Joseph, Mo.	80,935	....	....	....	....	21.8	22.8
Topeka, Kans.	64,120	45.7	81.5	110.1	110.1	106.3	110.1
Waterbury, Conn.	99,902	40.5	47.1	54.0	45.1	51.6	56.3
Winston-Salem, N. C.	75,274	76.0	53.3	53.3	47.7	43.0	....
York, Pa.	55,254	28.1	....	....	....	....	....

Population Group V * *City*	*1930 Population*	*Official Per Capita Expenditures (in cents)* 1930	1931	1932	1933	1934	1935
Amarilla, Tex.	43,132	....	....	....	....	73.3	76.5
Amsterdam, N. Y.	34,817	50.4[4]	50.5[4]	51.5[4]	41.5[4]	43.9[4]	....
Ann Arbor, Mich.	26,944	....	....	....	....	29.4	29.4
Attleboro, Mass.	21,769	79.3	83.0	....	....	....	....
Auburn, N. Y.	36,652	58.5	60.2	55.4	....	34.8	96.8
Aurora, Ill.	46,589	26.1	26.1	26.1	21.7	35.6	36.9
Battle Creek, Mich.	43,573	52.8	52.8	....	....	....	....

* Group IV—Cities of 50,000 to 100,000 population
" V—Cities of 20,000 to 50,000 population

2. Public health and hospitals.
3. Public health.
4. Health Department only.

Population Group V (Cont.) * City	1930 Population	Official Per Capita Expenditures (in cents) 1930	1931	1932	1933	1934	1935
Bellingham, Wash.	30,823	....	....	....	65.6	37.8	....
Boise, Ida.	21,544	37.4	40.3	38.4	37.2	35.6	23.2[5]
Burlington, Iowa	26,755	50.9	63.6	....	....	....	....
Brookline, Mass.	47,490	130.5	138.0	141.7	140.1	143.9	145.0
Champaign, Ill.	20,348	21.1	7.4	7.4	7.4	7.9	....
Cumberland, Md.	37,747	79.5	82.1	....	....	....	....
Dubuque, Iowa	41,679	87.0	52.1	....	....	36.4[4]	37.0[4]
Eau Claire, Wis.	26,287	28.6	28.6	28.6	28.6	28.6	....
Elyria, Ohio	25,633	58.0	61.7	55.5	61.1	43.1	40.0
Fargo, N. D.	28,619	114.7	112.0	....	....	....	....
Fort Dodge, Iowa	21,895	....	54.6	....	....	....	....
Framingham, Mass.	22,210	116.6	109.2	....	....	82.5	88.4
Great Falls, Mont.	28,822	....	....	86.9	82.0	70.9	....
Greenwich, Conn.	33,112	180.3	174.3	....	166.5	136.4	225.9
Hackensack, N. J.	24,568	....	....	....	....	100.2	83.7
Hagerstown, Md.	30,861	....	....	....	38.1	....	....
Hannibal, Mo.	22,761	43.4	48.6	43.2	....	....	....
Hutchinson, Kans.	27,085	77.8	69.3	....	....	....	....
Ithaca, N. Y.	20,708	231.5	257.1	....	....	127.8	140.3
Joplin, Mo.	33,454	....	39.5	51.2	....	....	....
Lima, Ohio	42,287	....	....	17.8	....	....	....
Maplewood, N. J.	21,321	74.7	90.5	97.2	90.5	85.4	....
Marion, Ohio	31,084	....	....	....	....	33.3	32.9
Middletown, Conn.	24,554	....	....	47.6	....	34.6	35.2
Middletown, N. Y.	21,276	44.2	65.8	69.0	....	....	....
Middletown, Ohio	29,992	31.4	35.0	30.9	33.8	36.3	....
Mishawaka, Ind.	28,630	....	29.5	27.0	....	21.9	21.9
Muskegon, Mich.	41,390	126.8	134.7	....	....	....	....
Newburgh, N. Y.	31,275	93.9	110.3	103.8	....	....	....
Newport, R. I.	27,612	85.8	78.2	91.0	86.1	69.2	....
Orange, N. J.	35,399	78.0	78.4	71.3	65.5	67.2	103.8
Oshkosh, Wis.	40,108	74.1	48.9	....	....	....	....
Owensboro, Ky.	22,765	25.3	35.3	34.1	....	....	....
Pittsfield, Mass.	49,677	67.0	71.9	62.3	54.6	52.7	49.9
Plainfield, N. J.	34,422	....	....	....	....	90.4	90.4
Phoenix, Ariz.	48,118	....	....	....	....	54.7	68.9
Pomona, Calif.	20,804	....	216.3	96.6	....	141.4	....
Richmond, Calif.	20,093	110.9	108.3	100.4	....	....	....
Riverside, Calif.	29,696	24.0	22.0	22.1	20.3	20.6	18.3
Rocky Mount, N. C.	21,412	....	....	....	66.3	....	....
Rome, Ga.	21,843	29.3	45.6	....	....	....	....
Salem, Ore.	26,266	86.3	85.9	....	....	....	....
Sandusky, Ohio	24,622	35.2	35.2	....	....	....	....
Santa Barbara, Calif.	33,613	42.6	64.8	60.9	57.4	65.8	68.8
Sheboygan, Wis.	39,251	62.7	66.3	51.1	61.4	50.0	....
Steubenville, Ohio	35,422	23.0	....	....	....	....	....
Watertown, N. Y.	32,205	....	....	172.8	165.7	192.5	197.0
Wausau, Wis.	23,758	59.0	43.6	40.4	35.1	40.6	41.2
West Hartford, Conn.	24,941	....	42.6	52.9	42.5	42.9	....
West Orange, N. J.	24,327	98.4	101.0	83.6	74.2	....	....
Williamsport, Pa.	45,729	....	....	....	....	37.0	32.7
Winona, Minn.	20,850	52.7	52.7	52.7	47.9	47.9	47.9

* Group V—Cities of 20,000 to 50,000 population

4. Health Department only.
5. Budget.

Population Group VI * City	1930 Population	Official Per Capita Expenditures (in cents) 1930	1931	1932	1933	1934	1935
Albert Lea, Minn.	10,169	25.4	35.2	32.8	33.7	33.1	30.5
Atchison, Kans.	13,024	....	78.7	74.1	72.6	79.8	....
Athens, Ga.	18,192	111.9	109.8	87.8	84.5	85.4	....
Beckley, W. Va.	9,357	....	....	29.4	68.9	....	....
Benton Harbor, Mich.	15,434	16.8	16.8	....	....	....	....
Billings, Mont.	16,380	....	51.4	54.1	....	....	....
Blackwell, Okla.	9,521	....	....	....	....	68.6	66.7
Bluefield, W. Va.	19,339	84.7	70.6	91.5	61.6	57.6	49.9
Bozeman, Mont.	6,855	....	61.2	64.7	....	....	....
Bradenton, Fla.	5,986	51.9	51.9	....	....	....	....
Carrollton, Mo.	4,058	40.7	37.0	....	....	....	....
Charlottesville, Va.	15,245	....	114.5	....	....	....	....
Chestertown, Md.	2,809	181.6	187.5	186.9	189.6	....	....
Clarksville, Tenn.	9,242	28.3	32.2	....	....	....	....
Cliffside Park, N. J.	15,267	....	....	....	....	88.0	....
Columbia, Mo.	14,967	....	....	....	50.9	....	....
Corona, Calif.	7,018	....	....	....	....	61.2	58.6
Corsicana, Tex.	15,202	33.2	....	....	....	....	....
Coshocton, Ohio	10,908	....	....	....	....	....	20.2
Delaware, Ohio	8,675	29.0	29.0	29.0	29.0	29.0	....
El Dorado, Kans.	10,311	58.8	70.4	....	....	....	....
Elkton, Md.	3,331	51.9	....	....	....	....	....
Emporia, Kans.	14,067	63.1	43.5	57.9	50.1	....	....
Englewood, N. J.	17,805	....	....	....	69.0	62.2	66.6
Eveleth, Minn.	7,484	....	199.8	139.8	....	165.0	165.0
Faribault, Minn.	12,767	....	37.4	....	....	25.5	....
Fredericksburg, Va.	6,819	69.4	73.7	85.5	83.2	82.1	80.1
Grand Haven, Mich.	8,345	51.6	....	....	....	....	....
Greenville, Miss.	14,807	33.8	33.8	28.7	57.4	....	....
Helena, Mont.	11,803	....	78.7	79.4	92.4	103.6	....
Hibbing, Minn.	15,666	....	....	....	....	175.6	188.5
Huron, S. D.	10,946	62.1	62.1	....	....	....	....
Independence, Mo.	15,296	9.5	9.5	....	....	....	....
Jacksonville, Tex.	6,748	18.4	33.9	59.2	74.6	51.9	....
Jerome, Ariz.	4,932	....	73.0	....	....	....	....
La Porte, Ind.	15,755	....	31.2	....	23.4	....	....
La Salle, Ill.	13,149	124.2	149.2	151.3	95.6	92.5	....
Lodi, Calif.	6,788	79.7	88.3	84.7	....	....	....
Logan, Utah	9,979	....	....	....	....	18.5	18.5
Manhattan, Kans.	10,136	45.7	43.7	24.2	23.7	....	....
Marietta, Ohio	14,285	84.0	84.0	....	....	....	....
Medford, Ore.	11,007	65.5	....	....	....	....	....
Miami Beach, Fla.	6,494	161.0	145.3	....	85.5	139.0	192.2
Mitchell, S. D.	10,942	81.8	....	....	....	....	....
Muskegon Hts., Mich.	15,584	61.4	56.5	....	....	....	....
Natchez, Miss.	13,422	115.0	....	....	....	....	....
Natchitoches, La.	4,547	254.7	....	....	....	....	....
Newark, N. Y.	7,649	....	83.0	79.4	57.2	65.8	....
Ocala, Fla.	7,281	61.8	61.8	61.8	....	....	....
Ogdensburg, N. Y.	16,915	50.3	50.3	87.1	81.3	....	....
Oneida, N. Y.	10,558	....	....	....	....	71.1	71.1
Ontario, Calif.	13,583	87.5	112.8	....	....	....	....
Owego, N. Y.	4,742	31.6	....	....	....	....	....
Palestine, Tex.	11,445	14.4	....	....	....	....	....

* Group VI—Cities under 20,000 population

Population Group VI (Cont.) * *City*	*1930 Population*	*Official Per Capita Expenditures (in cents)* *1930*	*1931*	*1932*	*1933*	*1934*	*1935*
Palo Alto, Calif.	13,652	117.2	126.2	128.1	123.4	139.3	160.1
Peru, Ill.	9,121	125.1	122.5	117.8	96.4	94.8	....
Pikeville, Ky.	3,376	....	....	74.1	....	....	....
Plattsburg, N. Y.	13,349	137.6	162.1	123.6	117.5	114.4	....
Prescott, Ariz.	5,517	63.7	62.3	....	....	....	....
Princeton, W. Va.	6,955	....	13.2	13.2	....	....	....
Provo, Utah	14,766	....	....	....	....	94.1	....
Redlands, Calif.	14,177	27.2	45.2	....	39.7	....	....
Richmond, Calif.	6,495	....	....	....	117.9	....	....
Ridgewood, N. J.	12,188	109.1	97.9	86.8	57.4[4]	61.5[4]	61.8[4]
Roswell, N. M.	11,173	27.0	34.2	....	....	....	....
Sherman, Tex.	15,713	....	35.7	39.[illegible]	....	....	....
Shorewood, Wis.	13,479	98.0	101.0	88.0	87.0	82.0	80.0
Sidney, Ohio	9,301	104.2	....	....	....	....	....
South Haven, Mich.	4,804	41.6	37.5	25.0	....	....	....
South Orange, N. J.	13,630	110.4	....	....	....	....	....
South San Francisco, Calif.	6,193	....	....	....	....	67.3	69.0
Springfield, Vt.	4,943	10.1[4]	10.1[4]	10.1[4]	....	....	....
Tallahassee, Fla.	10,700	....	....	....	114.2	....	....
Texarkana, Tex.	16,602	48.8	....	....	....	....	....
Torrance, Calif.	7,271	....	....	....	160.0	....	....
Tyler, Tex.	17,113	50.7[4]	60.0[4]	40.8[4]	54.0[4]	55.2[4]	....
Washington, Iowa	4,814	....	....	....	....	55.9	....
Wellington, Kans.	7,405	185.4	....	....	....	....	....
White Bear Lake, Minn.	2,600	....	....	....	....	74.5	73.4
Winfield, Kans.	9,398	55.1	55.1	29.8	....	28.5	....
Winnetka, Ill.	12,166	85.5	87.3	116.4	106.2	....	....
Yuma, Ariz.	4,892	84.0	84.0	84.0	84.0	84.0	....
Woodward, Okla.	5,056	13.8	....	....	....	....	....

* Group I—Cities of over 500,000 population
" II—Cities of 250,000 to 500,000 population
" III—Cities of 100,000 to 250,000 population
" IV—Cities of 50,000 to 100,000 population
" V—Cities of 20,000 to 50,000 population
" VI—Cities under 20,000 population

NOTES

1. Exclusive of WERA.
2. Public health and hospitals.
3. Public health.
4. Health Department only.
5. Budget.

Averages for the entire group for each year have not been published because of the fact that the number of reporting cities varies so greatly from year to year. It may be of interest, however, to know that among 79 cities reporting for a 5 year period, the average per capita expenditure in 1930 was 86.5 cents; in 1931 it was 90.1 cents; in 1932, however, it dropped to 82.9 cents; while in 1933 it dropped still further to 73.3 cents; but in 1934 it rose to 76.6 cents. Although figures for 1935 are not as yet available for a comparable group of cities, indications are that the average per capita health expenditure was higher in 1935 than in 1934.

Future of Maritime Quarantine in Canada*

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IN order to evaluate future maritime quarantine activities, the problem should be considered from the standpoints of past experience and present-day public health knowledge. Quarantine was officially imposed for the first time in Canada on October 20, 1721, with the object of preventing the entrance of plague into the country. In the preceding year, plague was epidemic in Marseilles, 30,000 people having died of the disease; and as vessels were constantly plying back and forth between Mediterranean ports and Quebec, which was then the center of French Canada, de Vaudreuil, the Governor, and Begon, the Intendent, introduced the following somewhat drastic quarantine regulations. Literally translated from the French they read:

Captains or masters of vessels, bark or brigantine, from all Mediterranean Ports or which touched there, shall anchor in the stream off Isle aux Coudres. There, those who have cannon or swiveling guns shall fire three shots a quarter of an hour apart.

Those who have no cannon nor swivel guns shall fire three musket shots, also at an interval of a quarter of an hour apart.

One should also fly the distress signal. The same signal shall be repeated at intervals of two hours until such time as those whose duty it is to board the vessels will be cognizant of their arrival. It was forbidden to send small boats ashore, or to permit any member of the crew or passenger to disembark and communicate with any inhabitant of the colony. Corporal punishment was provided for the captain, master and those who went ashore. It was strictly forbidden to discharge cargo. An order was in force to burn any such cargo on the spot where found without further formality or judicial procedure.

The following list of questions was to be answered by the captain:

1. From what port does the vessel come?
2. At what ports did it touch on the voyage?
3. Was there infectious disease in any of the ports?
4. Were there any sick on board during the passage?
5. Were there any deaths?
6. How many?
7. With what disease?
8. Are there any sick on board at present?
9. How many?
10. What disease?

These quarantine regulations were revoked on June 19, 1724. If one compares the present-day list of questions submitted to captains of vessels undergoing quarantine inspection with that of 1721, it will be found that they do not differ essentially. Although this was the first occasion that quarantine was officially introduced, it was customary at an earlier date for the authorities at the port of Quebec to detain ships on which there was sickness until passengers and crews were examined by physicians.

* Read before the Conference of State and Provincial Health Authorities of North America at the Fifty-first Annual Meeting in Vancouver, B. C., June 22, 1936.

Soeur Francoise Juchereau, the historian of l'Hotel-Dieu de Quebec said:

> In the year 1710 a vessel named the Belle Brune arrived here (Quebec) coming from the Islands (West Indies). We suspected it of being infected with plague because four or five men were dead in less than twenty-four hours. We sent them surgeons to visit the sick and who, being satisfied that there was no danger to the community, they were permitted to disembark and we received from the ship many sick in our hospital, all of whom suffered with a burning fever during many weeks from an unknown sickness, but very dangerous by the ravages which it caused in the colony. Experience has taught us that it was the Mal de Siam (disease of Siam) that the Oriflamme brought to the Islands (West Indies) many years ago, and which has not left the country (West Indies) since that time.

"Mal de Siam" was the name given to yellow fever and it is of interest in passing to note that on account of the prevalence of this disease at the ports of New York and Philadelphia, Canada imposed quarantine against them in the year 1799 and again in the years 1802 and 1805.

Anticipation of the introduction into Canada of cholera, which prevailed in Europe in 1831, was the signal for extraordinary quarantine activities in the year 1832. Quarantine was established in that year at Grosse Isle in the St. Lawrence under the control of the military authorities, and all vessels proceeding up the St. Lawrence to Quebec were obliged to undergo quarantine. Two cannon placed at a strategic point were part of the quarantine equipment. Regulations similar in nature were introduced by New Brunswick, Prince Edward Island, and Nova Scotia. In spite of these precautions, cholera found its way into the country and thence into the United States with what disastrous result we know. In spite of quarantine measures, cholera was introduced by shipping and became epidemic in Canada in 1832, 1834, 1849, 1851, and 1854; and typhus was epidemic in 1847 and 1848. With the exception of influenza, these are the only occasions that contagious diseases were introduced into the country and reached epidemic proportions. Following the confederation of the provinces in 1867, a number of quarantine stations were established. Some of these have since been abolished. There are at the present time 4, namely, at William Head, B. C.; Grosse Isle, P. Q.; Partridge Island, N. B.; and Lawlor's Island, N. S. At all other maritime ports the customs officer acts as the quarantine officer. Should a case of quarantinable disease be discovered on board a vessel at one of these ports, the customs officer calls a physician, and the necessary quarantine measures are adopted. It should be noted that the number of vessels that call at these unorganized ports is negligible. If facilities are not available for handling a case of quarantinable disease at one of these ports, the vessel is directed to the nearest quarantine station.

Each of the above mentioned quarantine stations is equipped with a quarantine boat for the purpose of boarding vessels, a disinfection plant, detention buildings for contacts, and a hospital. The total hospital bed capacity of the combined stations is 241, and the detention bed capacity 1,946. In addition, there is a fully equipped laboratory.

Prior to the adoption of the International Sanitary Convention, signed at Paris on June 21, 1926, quarantine included minor infectious diseases. Under the Convention, it comprises only 5 diseases, namely, plague, cholera, yellow fever, typhoid, and smallpox. It is laid down in Article 14 that Signatories to the Convention undertake to maintain in their large ports and their surroundings sanitary services capable of applying the prophylactic measures laid down in connection with the quarantinable diseases above men-

tioned, and the Signatories are obliged to supply at least once a year to the Office International a statement of their sanitary organization. The Convention laid down the sanitary procedures to be followed in dealing with the quarantinable diseases when they are found aboard ship.

Article 15 states that any ship, whatever its port of departure, may be subjected by the sanitary authority to medical inspection. It is not obligatory to inspect all ships arriving at a port, although that is now the practice in many countries, including the United States and Canada. That much of this routine inspection is unnecessary, wasted effort, and futile, is well known.

It is stated that plague found its way into Quebec in the years 1710, 1718, and 1740, but a study of the meager records of those years leaves one very much in doubt as to the true nature of the epidemics. It is also claimed that 2 cases of plague were found in Vancouver and 1 in Victoria in 1906 and 1907. The cases in Vancouver were that of a young woman and a laboring man; while that in Victoria was a stevedore. All 3 recovered. During the summer of 1919, it was reported that 2 cases of plague occurred in a ship while on its way from Montreal to Bristol, the ship having sailed originally from Alexandria. The diagnosis was made in Liverpool. It has not been possible to confirm the diagnosis in any of these cases, but I think you will agree that the likelihood of plague being introduced by shipping today is rather remote, particularly in view of the extraordinary precautions that are taken to de-ratize vessels in all world ports.

The last time that cholera was brought to Canada was by a vessel which arrived in Halifax in the year 1871. Two men who were employed in coaling and watering the vessel contracted the disease, one of them conveying it to his family, 4 being infected and 2 dying. The widespread epidemics of cholera during the so-called cholera years in Canada were water-borne. The presence of cholera in a community today would not occasion alarm in view of the fact that practically all cities are possessed of modern filtration plants and water carriage systems.

No case of typhus has been found aboard ship at a Canadian port since 1915—21 years ago—and as immigrants from Europe to Canada are all deloused before embarkation, the probability of its occurrence is negligible.

We have not found a case of smallpox on board any vessel at any of the eastern ports of Canada since 1929, but cases of that disease are occasionally found on board vessels at the Quarantine Station at William Head, B. C. The compulsory vaccination of immigrants from smallpox infected areas prior to embarkation has reduced the probability of its occurrence among immigrants on board ship to a minimum, and the adoption of the smallpox immunity reaction in the case of contacts has likewise reduced the number of detentions.

Yellow fever has never been known to occur in Canada even during epidemics of that disease in New York, Philadelphia, and Baltimore, so that it need not be considered seriously from the standpoint of quarantine.

At the present time all vessels entering the maritime ports of Canada are obliged to undergo quarantine. They anchor in the stream, where they are boarded by the quarantine officer who examines both crews and passengers to ascertain if any of them is suffering from a quarantinable disease. Such examination, however, is made only from sunrise to sunset. Should the vessel arrive at night, crews and passengers are not examined, the word of the captain or doctor, as the case may be, being accepted without question. This

is an anomalous situation. If crews and passengers are not examined in the case of a vessel arriving at night, then we may ask why the necessity of examining those that arrive in the daytime. Moreover, practically all vessels now have wireless, and the quarantine officer knows the state of health of the vessel long before it has arrived, and the need for detaining a healthy vessel in the stream until the quarantine officer has given pratique is quite unnecessary.

Until the International Sanitary Convention was signed at Paris in 1926, it was customary in the case of an infected vessel to disembark, bathe, and disinfect the clothing and baggage of contacts. Disinfection of clothing and baggage has not been done since the Convention was signed and no ill results have followed. To carry out bathing, disinfection, and detention, large buildings and extensive equipment are necessary. These buildings and equipment have been standing idle for years. Staffs are required to maintain them, the expenditure is great and, in view of the exceptional occasion that quarantinable disease is found on board vessels, quite unjustifiable. Quarantine procedure needs to be modified. Park, in discussing quarantine in his *Public Health and Hygiene* published in 1928, has this to say about quarantine:

> The discoveries of the modes of transmission of yellow fever, typhus fever, and plague, and the development of public health activities by the Government, states, cities, and counties, all tend to minimize the necessity of doing more along purely maritime quarantine lines than to regard it as a palliative measure which is declining in importance in almost exact proportion to the effectiveness of public health measures in the ports of the world.
>
> Whenever a proper spirit of effective coöperation can be brought about on a permanent basis, wherein the Governments, port authorities, and shipping interests will unite on both business and public health principles to abolish maritime quarantine, except under extraordinary circumstances, such as epidemic or war conditions, the ordinary quarantine station, as we know it, need not be maintained.

After 25 years of experience in connection with maritime quarantine in Canada, I am firmly convinced that the boarding of all vessels by a quarantine officer in ports is quite unnecessary and should be discontinued or modified. There is no necessity to board all vessels that enter Canada, and I feel satisfied that the same thing applies to the United States. Quarantine inspection might well be confined to those vessels which report quarantinable disease on board, have had it on board during the voyage, or which come from an infected port. In Great Britain vessels included in the official list of infected ports and those that have infectious disease on board, or have had it on board during the voyage, are subject to quarantine inspection on arrival. Should a case of quarantinable disease be found on board, it is removed to hospital while the rest of the passengers are permitted to proceed to their destination, their names being forwarded to the public health officer who keeps such passengers under supervision. In this way, there is no need for maintaining large quarantine stations and staffs. We are told that the objection to this procedure in Canada, and I believe in the United States, is that we are not as highly organized from a public health standpoint as England, where there is central public health control, and that it would be impossible to obtain the coöperation of public health officials of provinces and states to supervise passengers from infected vessels who had been permitted to proceed to their destination. During 1934 only 2,065 vessels were boarded by medical officers in London, whereas 20,856 were inspected at that port for the purpose of ascertaining the presence of rats and for de-ratization. Keeping down the rat population in vessels is

considered of greater importance than the routine examination of passengers and crews for the presence of infectious disease.

The boarding station for the London area is at Gravesend and, in addition to a launch, comprises a hospital consisting of one ward of 8 beds, one of 4 beds, and 8 cubicles. There is also a smallpox hospital containing two wards of 4 beds each. Such are the quarantine facilities of the greatest of world ports at which thousands of vessels arrive annually.

In concluding this brief paper, I would recommend that the following modifications be made in Canadian quarantine procedure:

1. That quarantine inspection be confined to vessels that report quarantinable disease on board, or have had such disease on board during the voyage, or have come from an infected port so declared in the official list.
2. That vessels be boarded at the dock and not in the stream as at present. An exception may be made in regard to the latter only where boarding in the stream expedites quarantine procedure.
3. That the large, expensive, unwieldy and unnecessary quarantine stations be abandoned, substituting therefor small, modern units consisting of detention quarters for not more than 100 persons and a hospital unit on the cubicle system of half a dozen beds.
4. That de-ratization requirements as laid down in the Convention of Paris of 1926 be adhered to.
5. That laboratory facilities for bacteriological examinations be made by arrangement with the port health authorities.

I believe that such procedure will afford adequate protection to the country.

DISCUSSION

C. E. WALLER, M.D.

Assistant Surgeon General, U. S. Public Health Service, Washington, D. C.

I think, although I am not prepared to speak for the chief of our Division of Foreign Quarantine of the U. S. Public Health Service nor for the Surgeon General, that the Public Health Service would be interested in this proposal. In fact, members of the Surgeon General's staff have often discussed this very thing and have given a great deal of consideration to it.

I might be willing to go just a little bit further than Dr. Heagerty has gone and suggest that one of the most effective protection measures as far as the introduction of disease into the United States is concerned would be the development of adequate local health services at our seaports and along our borders.

As far as bubonic plague is concerned, I believe we can accomplish far more in protection by rat-proofing vessels and rat-proofing our seaports. The principal disease that the United States has to fear right now, so far as introduction is concerned, is yellow fever through airplane travel from South America. However, I think if we could persuade our state and local authorities to clean up this disease, even in our southern states, we need have no fear of introduction of yellow fever through airplanes.

RESOLUTION *

RESOLVED that the Conference of State and Provincial Health Authorities of North America endorse the recommendation contained in the address presented by Dr. J. J. Heagerty of the Department of Pensions and National Health of the Dominion of Canada, that the Maritime Quarantine Law be amended and its operation so simplified as to prevent the inconvenience to individuals entering Canada and the United States and particularly to reduce the expense to the shipping industry of the Dominion of Canada and of the United States.

* Adopted by the Conference of State and Provincial Health Authorities of North America, Vancouver, B. C., June 23, 1936.

Report of Committee on Transportation*

WALTER L. BIERRING, M.D.

Chairman of the Committee, and State Health Commissioner, Des Moines, Iowa

IN confining this report on transportation to the problem of air conditioning of trains, it is hoped to present certain sanitary aspects that may be of interest to this conference. I acknowledge my particular appreciation to Thomas R. Crowder, M.D., the *Consultant,* as without his valuable assistance this report would not have been possible.

As recently described by W. B. Coffey:[1]

> Air conditioning is a new term, comparatively recently adopted to describe synthetic or tailor-made weather, or the production of a comfortable atmospheric environment compatible with health in which to travel, work, and live. Air conditioning is concerned with the heating, humidifying, cleaning, circulating, and deodorizing of the air in winter, and the cooling, dehumidifying, cleaning, circulating, and deodorizing of the air in summer. With the elimination of discomfort it might tacitly be assumed that comfort will follow. To a large extent this is true in the present state of progress, but not completely so. Like other synthetic materials, synthetic weather is still inferior to the best that nature has to offer. No one has yet synthesized the weather of a perfect spring day, or of a glamorous sub-tropical moonlit evening.

Railroads since 1930 have equipped about 6,000 railway passenger cars with air conditioning devices for the following purposes, as stated by Dr. Coffey:

> 1. To improve health, safety and comfort of the passengers, especially in the summer vacation months, when the weather constitutes a real drawback to travel.
> 2. To produce as far as possible the general sense of physical well-being.

Two methods of air conditioning trains are now in general use. They are (a) mechanical cooling, and (b) ice cooling. The former uses a liquefied gas which cools a bin type radiator when evaporated within it; the latter uses water from melting ice, which cools a similar radiator when circulated through it. In each case the air is cooled by passing over the radiator. Regulation of the amount of cooling is accomplished by thermostatic control of the rate at which the expanding gas in the one case or ice water in the other is pumped through the radiator.

Variations of the above systems are found, one of which utilizes the evaporation of water in a very high vacuum to cool the radiator. From a mechanical and engineering standpoint installations vary widely. The Pullman Company has its own scheme, while the various railroads have utilized others which differ in many essential respects among themselves. All systems utilize recirculation of the air, requiring, therefore, a closed system of ventilation with some mixture of fresh and recirculated air in the ducts.

A description of one modern air-conditioning installation on trains is given in the March, 1935, issue of *Heating, Piping and Air Conditioning.* Thus, in describing the units of the Flying Yankee it is stated:

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* Presented before the Conference of State and Provincial Health Authorities of North America at the Fifty-first Annual Meeting in Vancouver, B. C., June 23, 1936.

Each of the 5 passenger compartments of the new Flying Yankee is air conditioned, the compressors and condensers being housed beneath the floor of each unit, while evaporators and distributing fans are built into the roof above the vestibules. Fresh air is taken in through the doors into the vestibules and is then passed through filters where it is mixed with recirculated air in the proportion of 1:5. In the evaporator are located two combination cooling and heating coils, one at either side, and between these are two double blowers which project the conditioned air through centrally located grilles into opposite passenger compartments. The air is returned through grilles at either side of partitions at the roof. Here, too, are located removable and washable filter pads. Capacity of the refrigerating system is 5½ tons per car. In moderately cold weather the overhead coils heat the compartments with outside wall radiation. The entire equipment for the train weighs approximately 4,600 pounds complete.

With regard to the general mechanical requirements of railway air conditioning, the following remarks taken from the *Guide of the American Society of Heating and Ventilating Engineers* (14th ed., 1936, chapter 13, p. 258) may be stated:

The general principles of air conditioning as applied to buildings also apply to railway cars, but due to space and weight limitations and the severity of the service, equipment designed for stationary work in buildings is seldom suitable for car installations. Equipment for railway use must be safe, reliable, compact, light in weight, accessible for inspection and repairs, as nearly automatic in operation as possible, and have low initial operating and maintenance costs. To air condition a car properly, ventilating, filtering, heating, cooling, humidifying, and control equipment must be provided together with an adequate power supply. Air from the interior of the car is mixed with air from the outside and passed through the air conditioning unit where it is heated or cooled, humidified or dehumidified and delivered to the interior of the car through suitable ducts and grilles.

One of the important problems in connection with air conditioning of cars is that of ventilation. In non-air conditioned cars, ventilation is accomplished by exhaust fans, roof ventilators, and open doors and windows. This provides an ample supply of outside air and in addition a large amount of smoke and dirt which may be excluded in an air conditioned car.

An average car contains approximately 5,000 cu. ft. of air which is being contaminated by the occupants who are continually liberating heat, carbon dioxide, moisture, odors, and some organic matter from the breath, skin, and clothing. The heat and moisture can be removed by cooling and dehumidifying, but the others can be handled only by proper ventilation. In the average car from 2,000 to 2,500 cfm. of air should be delivered by the air conditioning unit.

Smoking rooms present a special problem. The cloud of smoke that usually hangs near the ceiling can be broken up by having the incoming air directed along the ceiling in all directions at a velocity somewhat higher than that used for the rest of the car. The air should be exhausted from the room by a fan or through a grille to the wash room or lavatory, to be exhausted to the outside through a ventilator.

Air conditioning of trains is based on comfort considerations. In this respect, a distinction between short and long hauls must be made. The human body requires from 1½ to 3 hours to become thermally adjusted.

Naturally, trains take on and drop passengers along route and the question as to whether adjustment for short or long haulage air conditioning at best is open to question.

It must be held in mind in dealing with air conditioning problems that personal acclimatization is an important factor. The sense of coolness on entering an air conditioned car is temporary and body adjustment will take place only after a period of time which will give a person a sense of comfort. Furthermore, as must be obvious, not all persons can be comfortable under one set of conditions. Age, sex, clothing, and state of health are factors to be considered.

Remarkable results are reported from the research laboratory of the Harvard School of Public Health on the application of ultra-violet rays to air conditioned chambers with a marked reduction of total bacterial count.

The essential principles of air conditioning are—

1. *Ventilation* — Defined as the process of supplying or removing air by natural or mechanical means to or from any space. Air conditioning is more

inclusive and implies the control of any or all the physical and chemical qualities of the air. Ordinarily, both ventilation and air conditioning are concerned with creating comfortable and healthful conditions in closed spaces.

2. *Physiological Reactions*—The importance of temperature, humidity, and air motion depends upon the influence which these factors exert on body temperature, comfort, and health. Our body temperature which is extremely constant, is dependent upon the balance maintained between its heat production and heat loss. This balance is automatically maintained in healthy persons by the action of the heat regulating mechanism. This is done by (1) regulation of internal heat production (chemical regulation), and (2) regulation of heat loss by automatic regulation in the rate of cutaneous circulation and the operation of sweat glands (physical regulation). On warm days, it is to be noted that the surface circulation of blood is increased; on cold days, the surface blood vessels contract and thus lie further beneath the skin which tends to insulate them.

3. *Acclimatization* — Acclimatization deals with man's ability to adapt himself to changes in air conditions. This is usually accompanied by an intangible psychological factor. Some persons appear to suffer intensely in a room with windows closed although atmospheric conditions generally may be quite comfortable. Perhaps the best example of acclimatization is our adaptability to winter and summer conditions of comfort. Thus, in summer a temperature of 68° F. may be uncomfortably cool, whereas in winter such a temperature is felt to be warm. Clothing alone does not explain entirely these different sensations.

A moderate amount of variability in temperature is known to be beneficial to health, comfort, and the performance of mental and physical work. On the other hand, extreme changes are not beneficial and often are definitely harmful. The high pneumonia rate prevalent among steel and foundry workers who are subjected to wide variations of temperature illustrates the deleterious effects of sudden temperature changes of wide range.

4. *Comfort*—Our sensations of comfort are dependent upon temperature, humidity, and air motion, and also the factor of radiation between a person and surrounding hot or cold surfaces.

No single comfort standard can be laid down which would meet every need, since the state of health, age, sex, clothing, activity, and degree of acquired adaptation are factors which affect comfort standards.

The greatest emphasis is always to be placed on the factor of comfort.

PUBLIC HEALTH ASPECTS

Aside from reports in engineering publications, very little information is available on the relation of air conditioning to health and disease.

In a report by Dr. Crowder on the medical aspects of air conditioning to the Association of American Railways this year, the following comments appear:

1. There appears no dependable evidence that the passing between a cooled car and the outside in either direction has an effect on the production of the common cold. These changes are regularly undergone in winter, although there is generally an increase of clothing in going from warm to cold, which in summer there is not. In summer there is also the further element of sweat.

2. There is considerable evidence that both hay fever and asthma are temporarily relieved by several hours of traveling in air conditioned trains. There seems no doubt that in hot weather cooled cars will bring a degree of relief to the victims of these conditions on the simple basis of their coolness, their lower humidity, and their relative freedom from dust, while the limitation of pollens may benefit them specifically.

3. During the terrible dust storms that obtained throughout the Central West last year,

air conditioned cars remained essentially free from perceptible dust, and passengers went through with comfort, whereas ordinary cars became at times almost intolerably dusty.

4. There is a rather common opinion that "on leaving the conditioned car the temperature change is too abrupt"; yet the same abruptness prevails in winter on entering a warmed room from without and with a much greater temperature change. It is not believed that it does any harm, though it may cause temporary discomfort. At any rate, the fault here seems to lie with the outside and not with the inside. As the lawyers would say, the weather is an Act of God, and there is no responsibility for any damage it may do. Air conditioning plans to maintain good weather inside regardless of what nature provides.

5. The criterion of our success in air conditioning is bodily comfort—no chilliness, no sensible sweating, no congestion of the skin and mucus membranes from a distorted circulation in its attempt to get rid of body heat to a reluctant environment. These are the conditions under which normal physiological functions are maintained in normal balance, so far as the medium in which we live controls them. They are, then, the conditions for the maintenance of bodily health in so far as health is affected by this same meduim.

If we accept this view, air conditioning must be a health promoting measure rather than one which holds any danger of harm. There is no evidence that it contributes to ill health if reasonably well done. With continued improvement, it may be said with confidence that air conditioning will be a benefit rather than a danger to public health.

REFERENCE

1. Coffey, W. D. *Pacific Coast Med.*, 3, 1 (Mar.), 1936.

Emancipation of Women

THE nervous strain of public competitions is in my judgment more likely to be productive of damage to the reproductive organs than any physical exertions. If such men as Perry and Crawford crack under the strain of tournament tennis it cannot be particularly beneficial to the woman's more labile nervous system. Further, stars at any game or sport either remain single or if they marry they frequently remain barren. We may therefore conclude that exercise and sport in all forms are good for women, but that there is room for doubt whether the strain of serious competitive sport and the attitude towards reproduction it imposes are beneficial either to the individual or ultimately to the nation.—Geoffrey W. Theobald, M.D., Some Effects of Emancipation on the Health of Women, *J. State Med.*, June, 1936.

Newer Aspects of Amebic Dysentery*

STUDENTS of public health will recall that in the summer of 1933 a unique outbreak of amebic dysentery occurred, with the point of origin at Chicago. The outbreak was largely synchronous with the Century of Progress Exposition. It will be recalled further that the infection in the great majority of cases was traced to sources in two hotels. The Committee on Research and Standards of the American Public Health Association appointed a sub-committee composed of engineers, health officers, and epidemiologists who studied the facts in connection with the outbreak in order to make readily available information that would be of value to sanitary engineers, health officers, and others. The report of this sub-committee, which has been approved by the Committee on Research and Standards, follows:

ADMINISTRATIVE

The committee is of the opinion that the routine examination of food handlers for the purpose of discovering carriers of amebic dysentery is impracticable, and of no value as a public health control measure.

Amebic dysentery (clinical amebiasis) should be a reportable disease in all health jurisdictions.

Neither isolation of the patient with amebic dysentery (clinical amebiasis) nor quarantine of contacts is considered necessary or desirable.

An effort should be made to determine the source of infection in each (amebic dysentery) case.

* Report of the Sub-Committee presented to the Committee on Research and Standards May 19, 1936.

Existing designs and installations of water systems in buildings should be studied by competent authorities to detect and eliminate hazards to the safety of the water supply.

The committee is of the opinion that plans for water supply piping systems in buildings, including storage tanks and accessories and the drainage system pipes, should be examined and approved by competent authorities before the issuance of construction permits, in order to prevent potential hazards to the safety of the water.

The committee is of the opinion that where a city water supply for drinking or domestic purposes is derived from a source subject to contamination, the purification process should include filtration for the removal of the cysts of the *Endameba histolytica* because of their resistance to other forms of appropriate treatment, such as chlorination.

Pending the determination of the source of infection in institutional or other localized outbreaks immediate steps should be taken to:

1. Provide a safe supply of water by boiling or changing the source of the water supply to one of known purity.
2. Utilize all known measures for the protection of the food supply.
3. Correct all obvious insanitary conditions and practices.
4. Enlist the coöperation of both a competent public health engineer and an epidemiologist.

It was voted to recommend to the Committee on Professional Education that consideration be given to the practicability of encouraging the training of a greater number of thoroughly competent protozoölogists.

ENGINEERING

(See also Engineering Appendix)

In the prevention of amebic dysentery, consideration should be given to the following engineering policies:

1. Complete physical separation of all water systems used for drinking or domestic purposes from secondary water systems.
2. Regular systematic and thorough inspection for cross-connection hazards on premises wherever secondary water systems exist or where the domestic water supply is re-used for any purpose.
3. Establishment of practical working policy for supervision and control of such hazards between municipal water works and the health authorities.
4. Education of architects, designing engineers, building owners and operators, and plumbers in the prevention and correction of such hazardous conditions.
5. Protection of the water supply for drinking or domestic purposes against contamination through fixtures, processing tanks, sewers, etc.
6. Adequate enforcing of an up-to-date plumbing code governing installation of water supplies, fixtures, and drainage systems.

EPIDEMIOLOGICAL

In the epidemiological study of amebic dysentery, in addition to such previously accepted factors of transmission as by eating of contaminated food, by hand contact with moist objects soiled with discharges of infected individuals, and by flies, consideration should be given to the following facts:

1. Transmission by water has been established beyond question.
2. A water supply indicated as satisfactory by the physical, chemical, bacterial, and microscopic analysis made in accordance with standard methods of water analysis may not be free from living pathogenic protozoa.
3. Manifest clinical disease occurs in but a small proportion of those newly infected.
4. Evidence as to the distribution of the infection may be effectively sought through the examination of stools of healthy persons possibly exposed.
5. Amebic dysentery should be looked for in the epidemic occurrence of any water-borne disease.

CLINICAL

Delay and inaccuracies in the diagnosis, and inadequate or inappropriate treatment contribute to the severity of amebic dysentery and may be responsible for a high mortality rate. Better clinical teaching relative to this disease is emphasized as an effective measure for control and treatment. It should be emphasized to all physicians and medical students that:

1. Amebic dysentery is not limited to the tropics.
2. Atypical clinical manifestations are commonly encountered. Acute surgical conditions of the abdomen may be closely simulated.
3. Specifics are available which if administered early and in adequate dosage almost invariably bring prompt relief and rapid recovery.
4. Diagnosis of amebic dysentery should be considered in any case characterized by blood and mucus in the stools.
5. Entire dependence should not be placed in negative findings of stool examination in diagnosing clinical amebic dysentery as the disease may exist even though laboratory findings are negative.

NOMENCLATURE

It *is* the opinion of the committee that if the term "amebiasis" be used it should be followed by the words *amebic dysentery* in parentheses when a clinical condition is referred to and by the word *carrier* in parentheses when a carrier is meant.

Those interested in a more detailed discussion of the various aspects of amebic dysentery are referred to *Bulletin 166* of the National Institute of Health, entitled "Epidemic Amebic Dysentery—The Chicago Outbreak of 1933."

GEORGE W. MCCOY, *Chairman*
JOEL I. CONNOLLY
W. F. DRAPER
ARTHUR E. GORMAN
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ENGINEERING APPENDIX

Recognizing that something more than a simple delineation of engineering policies pertaining to safeguarding water systems is desirable, the following supplement to this report is submitted.

I. SEPARATION OF DRINKING OR DOMESTIC WATER SUPPLIES FROM SECONDARY SUPPLIES

Definition: By a secondary water supply is meant water from a source other than that used for the drinking or domestic supply in the community, institution, or premises, including reused water from any source.

A. Where a secondary water system exists on any premises, it is generally deemed prudent and in the interest of public health to require that the public water system be definitely protected against any possibility of pollution from the secondary system. An effective way of accomplishing this is to require that the premises be supplied from the public system through an intermediate reservoir or tank with piping and fittings so arranged that under no circumstances could the secondary water be forced or drawn back into the mains of the public system. The tank should be so located and covered as to be protected against flooding by sewage. Preferably it should be above ground. Such a requirement may, in some instances, necessitate re-pumping of the water obtained from the public system. This extra cost is not considered unreasonable in view of the potential risk to the public water system which may exist because of the maintenance of the secondary source of supply. An example of this case would be a plant or premises maintaining a secondary water system from a polluted source for fire protection or industrial uses.

B. Although in new installations complete separation of water systems may be accomplished, there is no assurance that at some future date cross-connections between the domestic and secondary system will not be made. Therefore, practical and effective means must be adopted to check and minimize this possibility. One to be recommended is the identification of the various exposed piping systems by painting them distinctive colors. Light blue is suggested for the domestic water system. Other checks are the keeping of up-to-date accurate *piping diagrams* and the centralization of authority for all piping changes or additions. The lack of proper piping diagrams may result in cross-connections being made innocently by parties not familiar with local piping installations or because of lack of proper working drawings. This is especially true when work is done by outside contractors or where a new operating staff is assigned to a plant. By centralizing responsibility and authority for all piping changes in one competent person, much could be accomplished in preventing cross-connections of "convenience" and "ignorance" which are made more frequently than is generally recognized. Before changes or additions to the water piping systems on premises are made, the plans should be approved in writing by the proper official in charge of plumbing inspection, or of the public water supply, or both.

C. Under certain unusual and very extreme conditions, where the hazard to life because of fire is obviously and demonstrably greater than the health hazards, if a physical connection be provisionally permitted between a domestic and a secondary water system, the interconnection should be protected by approved double check valves with a drain in the pipe between the two checks valves and an alarm system to

warn the responsible operators when water passes by either check valve. Such a system should be under regular and frequent inspection of the health and water authorities and should be fitted with the necessary accessories to permit convenient testing of the double check valve system. An interconnection of this type should be made only after securing written approval of the responsible health authorities, and should be removed as soon as some other safe and adequate means of fire protection can be obtained.

II. INSPECTIONS TO DETECT CROSS-CONNECTIONS AND ALLIED HAZARDS IN WATER AND DRAINAGE SYSTEMS

Every health and water department should catalogue premises within its jurisdiction where secondary water systems are maintained. Regular and frequent inspections should be made to see that cross-connections are not made and that all other potential hazards are eliminated or effectively guarded against. These inspections should be thorough in every detail. Inspectors should be instructed to analyze plant conditions from the standpoint of potential hazards which might develop under abnormal as well as normal conditions. Usually pollution of water supplies results from extraordinary conditions neither expected nor provided for.

Practical tests should be made of hydraulic conditions established in the piping and drainage systems when subjected to abnormal flow conditions. The use of apparatus and instruments for recording performance during these tests is recommended. In general, tests should subject the entire waste system to pressure sufficient to detect leakage which might not develop under average flow conditions. The water system should also be subjected to negative head or vacuum to detect possible siphonage from fixtures, processing tanks, or drains.

In old buildings, the pipes should be inspected for corrosion and deterioration of any character, especially in the upper half of the pipes. Piping, tanks, or other equipment subject to strain under abnormal conditions should be carefully examined. Examples of abnormal load conditions are: water hammer, pressure due to heat or ice formation, failure of safety valves or vacuum breakers, excessive wind and snow loads, flooding, failure of tank supports.

Under no circumstances should sewer or drain pipes pass directly over open water tanks or premises where ice or food is being stored or handled.

Food and water, including ice, should not be stored, prepared, or handled where there is any possibility of flooding due to back flow of sewers under pressure. Drains from water tanks, filters, refrigerators, and other food storage space should not be directly connected to sewers.

III. WORKING POLICY BETWEEN HEALTH AND WATER WORKS OFFICIALS RELATIVE TO WATER SUPPLY HAZARDS AND RESPONSIBILITIES

A. It is particularly important that public health and water works officials coöperate with each other closely, in the elimination and prevention of cross-connections, and also with fire and building department officials in general.

B. Definite policies should be agreed upon, defining the respective jurisdictions and permissible remedial measures which may be applied for correction of defects discovered, and approved preventive measures to guard against creation of new ones.

C. Public health engineers should be employed by health departments to supervise the technical work under their jurisdiction in this field, and promote harmonious coöperation with the engineers in the water department in their portion of the work. Wherever

a health department is unable to secure the services of an engineer, because of small size or other reasons, some arrangement should be made for the assignment of an engineer by the water department to coöperate with the local and state health departments, keeping them adequately informed, and being guided by them in general matters of policy.

IV. EDUCATION OF ARCHITECTS, DESIGNING ENGINEERS, BUILDING OWNERS AND OPERATORS, AND PLUMBERS IN THE PREVENTION AND CORRECTION OF SUCH HAZARDOUS CONDITIONS

A. The education of responsible parties in the reasons for and methods of preventing and eliminating cross-connections and similar hazards is of paramount importance.

B. The method will depend upon local conditions, and might embrace:

Courses in medical, engineering, and architectural schools
Direct contact with plumbers and architects
Coöperation with building owners' associations and technical, trade, or professional societies, especially in the design, construction, and operating groups
Magazine and newspaper articles, radio, and motion pictures
Demonstrations by use of typical installations of dangerous connections and equipment
Conferences with those who installed or permitted the continued use of hazardous connections
Conferences with manufacturers of equipment embodying objectionable features
Suggestions offered to contractors or others seeking approval of plans

V. PROTECTION OF WATER SUPPLY FOR DRINKING AND DOMESTIC PURPOSES AGAINST CONTAMINATION THROUGH FIXTURES, PROCESSING TANKS, SEWERS, ETC.

Wherever water enters a fixture, tank, or container through a pipe terminating below the surface of its contents, there exists a possibility that such contents may drain or be siphoned into the water supply pipes. In such cases, the fixture may act as a supply reservoir or stand-pipe during periods of reduced pressure. Should the fixture or container hold pathogenic bacteria, as in bottom supplied instrument sterilizers in hospitals, or chemical poisons, as in many tanks and vats in factories, such submerged inlets present real hazards to the safety of the water supply. Reduction in pressure and conditions of negative head (vacuum) are not at all uncommon in water systems of hilly communities and in buildings, particularly on upper floors. They may be caused by many conditions, such as (a) shutting off the water pressure for repairs, (b) heavy draughts of water on lower floors, (c) breaking of pipes, (d) aspirator or sucking action of rapid flow in main pipes past branch connections, (e) use of fire engines in neighborhood, (f) cutting off water pressure to reduce flooding during stoppages in sewer pipes.

The existence of overflow connections, such as commonly found in bath tubs and lavatories, is insufficient protection because often the fixture contents may rise high enough to submerge the inlet in spite of such overflow connections, or stoppage of the drain pipe may permit sewage from higher levels to back up into the fixture through the overflow.

Wave action in containers may cause intermittent submerging of the inlet. Owing to the possibility that water may be drawn up in a miniature water spout if the inlet be near the surface, though not actually submerged, the inlet should be well above the highest level to which the fixture contents may possibly rise.

Circulating contents of fixtures or tanks as in air washers, swimming pools, etc., may also present hazards through priming connections to circulating pumps, particularly if the tanks are directly connected to the sewer. In

general, all such fixtures and containers which are connected to sewer systems or may contain water bacterially or chemically contaminated, should be regarded as part of the sewer systems and no direct connection of the water pipes to them should be permitted. If, for any reason, such direct connections are permitted, as in the case of flush valves, adequate protection against back siphonage should be required.

VI. ADEQUATE ENFORCEMENT OF AN UP-TO-DATE PLUMBING CODE GOVERNING INSTALLATION OF WATER SUPPLIES, FIXTURES, AND DRAINAGE SYSTEMS

A. Even in progressive and well managed cities, too frequently the plumbing codes are antiquated and obsolete, giving but relatively little attention to health protection and to prevention of water contamination, in proportion to the importance of these matters.

B. Much new information has come to light since the older of such codes were promulgated, which should now be utilized in modernizing them and increasing the stringency of sections pertaining to the protection of health. In amending old codes or drafting new ones, attention should be given to the following considerations:

1. The failure of customary amounts of residual chlorine in drinking water distribution systems to protect against spread, through water, of amebic dysentery and possible other diseases.
2. The increasing number and variety of uses for water in industry.
3. The new types of fixtures developed for processing, storage, washing, hydraulic, and refrigerating equipment in which water is used, such as air conditioners, heat exchangers, condensers, presses, etc.
4. The trend toward higher buildings, involving greater differences in pressures and greater possibilities of creating conditions of negative head or vacuum in water pipes.
5. The premium on space above ground for tanks in buildings located in centers of cities where property values are high.
6. The increasing requirements for fire protection as congestion in urban population becomes greater.
7. The greater demands for water for special purposes, especially air-conditioning, which may make past standards for pipe sizes entirely inadequate, and may promote loss of pressure and consequently make more frequent the contamination of water through submerged inlets, particularly where the topography is hilly and buildings are high.
8. The development of new types of vacuum breakers and siphon preventers.
9. The growing inadequacy of old sewers as adjacent property is improved, causing backing up and flooding by sewage into basements.
10. The tendency to place more and more service and operating equipment below the level of the street sewer, in sub-basements of buildings in areas of high land values, thus increasing hazards of direct sewer connections of water equipment in such deep excavations.
11. The increasing use of fixtures with overflows, condensate drains, or steam vents which may be connected with sewer or waste pipes, permitting sewage contamination of fixture contents, such as soup kettles, utensil sterilizers, autoclaves, sterilized water tanks, etc.
12. The re-use of water previously used, stored, or handled in a manner which might permit it to become contaminated, in order to conserve water where increasing demands are taxing to the utmost the capacity of the plant to supply enough water during peak periods.
13. Electrolysis causing leakage in sewer pipes due to grounding of electric wires from radio sets and other electrical apparatus.

C. Administration of the plumbing code should be vested in officials having the public health viewpoint and sufficient knowledge of the health hazards involved to give adequate attention to its many highly technical health problems. The plumbing code should be enforced by the health department, through the administration and under the direct charge of a competent public health engineer, in order to assure that the public health aspects of plumbing will be given the kind of attention warranted by their importance.

Plumbing inspectors should be given training in the elements of public health as related to water supplies, in order

that they may approach their tasks in the proper way. The reasons for the requirements of the code should be explained to plumbers and to the public in order to secure the coöperation of all concerned in observing the provisions. Restriction of plumbing work to competent persons by some form of registration, certification, or licensing is essential.

D. Plumbing plans should be submitted to and approved by the proper municipal official before the building permit is issued in all new installations and before the work is done on all subsequent alterations of importance.

Emancipation of Women

I HAVE made provocative and sweeping statements, but I would not like to convey the opinion that I despair of the modern girl. I find her honest, frank, a true "sportsman," knowing how to win and how to lose, who has shed hypocrisy more completely than the corset. The revolt of youth against incompetent old age which has the stranglehold on all civilized activities is understandable and commendable. Youth must, however, remember that the environment, including all the advantages, in which they live is the result of the labours of a long line of noble men and women and must not confuse the obstructionist tactics of the old men, possessing all the power in their hands, with eternal values. In the beginning God made them male and female and these differences are biological not man made. The stability of the race must depend on the purity of the family, and this cannot be maintained by forgetting biological facts. Sex must neither be flaunted nor forgotten and the married woman who claims to have the sole right over her own body is a biological reject. Of all the effects of emancipation the mental restlessness is the most ominous, while the need for physical culture and instruction on diet and hygiene are pressing. In my judgment a reorientation of values is much to be desired, and more stress should be laid on those which are spiritual.—Geoffrey W. Theobald, M.D., Some Effects of Emancipation on the Health of Women, *J. State Med.*, XLIV, 6 (June), 1936.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

SYLVATIC PLAGUE

WE have published in another column the Report of the Sylvatic Plague Committee. The use of the term *sylvatic* seems to us to be open to criticism. In the report of the committee we are correctly told that Dr. Jorge proposed the term *peste selvatique*, which would be "selvatic plague" in English. It is notable, however, that in his paper presented to the Comité de l'Office International d'Hygiene publique, the spelling *selvatique* as well as the spelling *silvatique* is used. The headings of the paragraphs are invariably spelt *selvatique,* and it does not seem that the spelling *silvatique* is accidental or a typographical error. Jorge calls attention to the fact that there is a type of plague which rages among wild animals occupying desert-like territory. The term *selvatic* has been accepted by Stallybrass and also by Wu Lien-Teh, who in his latest volume, *Plague* (1936), discusses the use of the word at some length. He says ". . . selvatic plague is dangerous to man only when he invades the remote endemic areas populated by wild rodents." The committee calls attention to the review[1] of the Memorial Volume, 1912–1932, edited by Wu Lien-Teh, in which the term *sylvatic* is used. They state that there is no doubt that the English word *sylvatic* is the correct spelling of the word which Jorge spelled *selvatic.*

We have studied a number of dictionaries, but will confine ourselves entirely to Webster, which for years has been the standard for our *Journal;* to the Standard; and to the Oxford, which is the last word in dictionary making for the English language. We find *selva* meaning the rain forest of the Amazon. According to the Oxford, this is also erroneously spelt *silva,* and usually used in the plural. It is derived from the Latin word *silva,* a wood, forest, woodland, "commonly misspelt *sylva*" in imitation of the synonymous Greek word *hyle.* All dictionaries seem to be at one on this point. Under the word *silva* we are referred to *selva.* Under *sylvan,* one meaning is an animal, especially a bird, living in or frequenting woods. The word itself is also used as an adjective:

"belonging, pertaining, or relating to, situated or performed in, associated with, or characteristic of, a wood or woods." It may be noted here that *silvan,* also spelt *sylvan,* is the more commonly used adjectival form. Webster says *silvan* represents etymology more exactly, but *sylvan* is in more general use. We find in the Oxford the word *sylvatic, silvatic,* L. *silvaticus,* marked "rare" (dating back to 1661), "belonging to or found in woods, transf. rustic or boorish." Webster also gives *sylvatic,* derived from the Latin word *sylvaticus,* "better spelt *silvaticus,*" meaning sylvan, also rude or uncivilized, Now Rare.

Without going further into the derivation, proper spelling and proper use of the word, we wonder whether the introduction of a new term is wise, and especially one over which there is room for criticism. We have seen that the best authorities dislike the spelling *sylvatic.* It is not the term proposed by Jorge, apparently the originator of the entire idea. It is not the spelling accepted by authorities on plague, by Stallybrass, or by Wu Lien-Teh, who incidentally is an exceptionally good linguist. We do not know who wrote the review in the *J.A.M.A.* referred to, but there is no discussion of the spelling *sylvatic,* and no evidence as to whether or not the reviewer made a study of it.

The term, whatever its correct spelling, has been applied to a type of bubonic plague found among wild rodents, and is used to differentiate the disease as found in them and as transmitted to man, from the ordinary, well known type of bubonic plague carried by "domestic" rodents, among which the rat stands preëminent. Is it not unfortunate to introduce a word which we have not been able to find in any medical dictionary nor in any English dictionary as applied to plague? As mentioned by the committee, the term has not met with unanimous approval among health officers. The report states that this type of plague is zoölogically and geographically different from the plague of the Middle Ages, but just the same it seems to be bubonic plague, whether or not it differs in some respects from the classic disease. Would it not be better simply to call it wild rodent plague, which is in accordance with the description given by Jorge and the actual words which he uses?

REFERENCE

1. Review of *Memorial Volume Manchurian Plague Prevention Service 1912–1932.* Edited by Wu Lien-Teh *J.A.M.A.*, 105, 7:535, 1935.

OCCUPATIONAL DISEASE CONTROL

DUST has often been thrown in the public eye to becloud an important issue, but in the case of silicosis, dust has caught the public eye and directed it to an important public health problem, that of occupational disease control. Thanks to the newspapers and other publicity agencies, many people who heretofore thought of public health problems as concerned only with placarding for communicable diseases and quarantine, now realize that there is hardly any hour of the day or night when their personal health is not being assured by the efforts of public health workers whose work embraces the whole field of preventive medicine entailing close coöperation with the general practitioner and all agencies concerned.

The view of the public health worker engaged in occupational disease control extends beyond diseases caused by dust, now occupying the foreground of the picture, and includes the entire panorama of the occupational disease landscape.

Fifteen million persons are gainfully employed in manufacturing and mechanical industries and extraction of minerals in the United States. This large group, which is of tremendous importance to the welfare of the nation, spend nearly a third of their adult lives in occupations of which more than 900 are potentially hazardous to health. Numerous investigations of the U. S. Public Health Service, other health agencies, and individual organizations and workers, both here and abroad, have established that morbidity and mortality rates are definitely higher for the general industrial population, and that certain occupations are of first importance as factors in the causation of excessive sickness and mortality rates. These excessive rates not only affect the industrial population but increase the rates of morbidity and mortality of the general population. The life expectancy of industrial workers is several years less than for those otherwise employed. Age for age the mortality rate for the industrial worker has been shown to be from one and one-half times to more than double the rates of the non-industrial worker. Tuberculosis rates are much higher in the industrial group and add to the cases in the general population; pneumonia rates are more than twice as high, and degenerative diseases show rates two or three times as high in the industrial group. It is concluded that while hereditary and innate differences play some part, the most important factors are the conditions incident to industrial employment such as toxic gases, dusts, specific occupational poisons, extreme temperature variations, and numerous other industrial health hazards.

The control of health hazards in working environment constitutes a public health problem of the first magnitude. Most of these hazards consist of exposure to materials injurious to health, and though numerically a larger proportion of these workers are exposed to materials, other than dusts, which affect their health, excessive exposure to quartz dust, with its resultant silicosis, is today recognized as the most serious of the occupational diseases.

Dr. Thomas Parran, Surgeon General of the U. S. Public Health Service,[1] brings out clearly the duty of public health officials in regard to their responsibility toward this problem and says we must "focus our attack toward the goal of eradication (of tuberculosis) upon, first, the young woman in industry or young mother; next, upon the worker in the dusty trades which form the background for many an unpublicized 'Gauley Bridge' disaster. . . ."

Public health officials have long recognized the importance of occupational disease control as one of the fundamental factors underlying any public health program. Of what use will our prenatal, child hygiene, or communicable disease control programs be if we do not continue to safeguard the worker's health in his environment.

Aside from effects on health, the economic implications are tremendous, for these conditions affect the earning capacity of the adults who are frequently the support of the family. Industry is burdened with tremendous costs for compensation; claims for silicosis alone are written in millions.

Occupational disease can be prevented. Industry cannot do it itself and no agency other than the public health authorities is organized or constituted to undertake it.

The State and Provincial Health Authorities of North America adopted a resolution stating that occupational disease prevention should be an integral part of the public health program. The American Public Health Association passed a similar resolution,[2] the Presidential Address containing specific recommendations for the inclusion of an occupational disease control program in public

health activities,[3] and recently the American Medical Association passed a resolution to the same effect. During the last few years articles by health authorities have appeared in various technical journals stressing the necessity and importance of this work, and that it is being undertaken by departments of health as part of their public health program.

It is essential that all of the public health phases of the problem be kept together just as in other public health measures, such as the epidemiology, survey and study of the working environment, and the necessary regulatory and enforcement measures.

The provision of funds for occupational disease control through Section VI of the Social Security Act created an immediate demand from health officers for appropriations to inaugurate and enlarge their occupational disease program, and permitted a concerted attack along the entire front of the occupational disease line by departments of health in 19 states and large municipalities.

Many of these states have taken advantage of money provided by federal funds for training purposes, and have sent their personnel to receive special training in problems of occupational disease control in a course given by the U. S. Public Health Service at Washington. These men received an intensive course of lectures and demonstrations, field and laboratory work, and will return to their respective health departments more capable of attacking the particular problems of occupational disease control in their own states. It is planned to continue these intensive courses, and to augment them in particular cases with special training at some of the universities where courses in the various phases of occupational disease control will be given.

We may now expect, in the not too distant future, to see the trend of silicosis and other occupational diseases approach the minimum residual as in typhoid and diphtheria.

REFERENCES

1. Parran, Thomas. Health Security. *A.J.P.H.*, 26, 4:329 (Apr.), 1936.
2. Resolution on Occupational Environment. *A.P.H.A. Year Book*, 1934–1935, p. 57.
3. Emerson, Haven. Public Health Awaits Social Courage. *A.J.P.H.*, 24, 10:1005 (Oct.), 1934

EDWIN OAKES JORDAN

IT is with the sincerest sorrow that we record the death of Edwin Oakes Jordan on September 3, 1936. Of rugged New England stock, he was educated at the Massachusetts Institute of Technology and was one of the earliest and most distinguished of Sedgwick's pupils.

After obtaining his Ph.D. at Clark University, he went to the new University of Chicago with the group from Clark that had faith in Harper and his educational ideas. All of Jordan's academic career was passed at Chicago. Here he built a department of bacteriology in which graduate instruction was emphasized. The roster of men and women teaching in universities and colleges and engaged in public health laboratory work, trained wholly or in part under him, is impressive. He was given the honorary degree of Doctor of Science by the University of Cincinnati in 1920.

Jordan's scientific work began immediately after his graduation from the Massachusetts Institute of Technology in 1888. He was in the group working under Sedgwick and Drown in the Massachusetts State Board of Health. Those were the days when bacteriologic technic was in its infancy and gelatin

plates were literally "plates" but Jordan's first publications in the almost forgotten *Technology Quarterly* for 1889 and 1890 show evidence of the same careful work that characterized the articles of later years. His interest in sanitary bacteriology aroused at this time was maintained throughout his nearly 50 years of active work. During the Chicago Drainage Canal suit, Jordan and his associates accumulated an immense amount of valuable data on stream pollution and the factors influencing the growth or disappearance of bacteria in streams. His classification of water bacteria made at that time, stands today. His scientific papers cover many fields of bacteriology. These range through early work on bacterial enzymes, milk and food bacteriology—particularly that phase dealing with food poisoning; a series of papers dealing with the bacteriology of influenza prepared under his direction and including his own contributions dealing mainly with the epidemiology of the disease and with the "influenza" group of bacteria; an extensive study of the paratyphoid group of organisms based on an unparalleled collection of cultures from all parts of the world. These studies on the paratyphoid group are representative of all of Jordan's scientific work. He was meticulous in his laboratory technic. Constant repetition, frequent and careful observation, untiring patience in solving laboratory problems, were the characteristics which produced data of indisputable accuracy. His scientific papers written in clear, concise, and faultless English can well serve as models for the rising generation.

In addition to laboratory investigations, the field of epidemiology was always an attractive one for him. His report on typhoid fever in Winnipeg is a classic and was the precursor of many signed and unsigned reports of epidemics, particularly of typhoid fever. Here again, his analytical mind and unwillingness to draw conclusions except from sufficient data are as prominent as in his scientific studies. As an epidemiologist he was in the front rank.

While not a fluent extemporaneous speaker, Professor Jordan's addresses and classroom lectures were clear and logical and were always carefully prepared and as carefully presented. No student could leave one of his lectures without a clear picture of the subject under discussion. Jordan contributed to bacteriological education through a readable and useful textbook on bacteriology designed particularly for students. First published in 1908, this has passed through eleven editions under his skillful supervision.

In addition to his work as teacher and investigator, Dr. Jordan found time to act in a variety of advisory capacities. He served for a number of years as a member of the International Health Board of the Rockefeller Foundation and, later, on the scientific advisory board when the International Health Division of the Foundation was formed. He was a member of the board which recommended drinking water standards to the U. S. Public Health Service. During the World War he was in charge of one of the laboratory cars of the American Red Cross and studied meningitis in several army camps. Much space would be required to list other activities of this sort.

Since joining the Association in 1899, Jordan has been truly an active member, his main interests naturally centering about the Laboratory Section. He was a member of the group which formed this section and served it as well as the Association in various capacities. When the Epidemiology Section was formed in 1929 he was one of its earliest members. He served on the Executive Board 1924–1925, on the Governing Council 1925–1930, and was Treasurer of the Association 1928–1929. In 1934 he received the Sedgwick Memorial Medal.

He was also concerned with the formation of the Society of American Bacteriologists and of the Epidemiological Society. As a co-founder and co-editor of the *Journal of Infectious Diseases* and as editor of the *Journal of Preventive Medicine* he had opportunity not only to publish some of the best scientific contributions but also to advise and encourage younger contributors.

Modest and retiring almost to a fault, he can well serve as an example of one who has attained eminence in his profession without the aid of the self advertising regarded by too many as necessary for reaching scientific prominence. As a companion he was a delight because of his wide reading, marvelously accurate memory, and his acquaintance with scientific men throughout the world. He will be missed by his contemporaries, his former colleagues, and the host of students who have received training and inspiration from him.

AN UNPAYABLE DEBT

THERE are few things more interesting than going over the old lists of members of a scientific association. They correspond closely with the papers found in old volumes of transactions—always a source of interest and often of information. Too often we forget what the older members of an association have done, and often the younger members are likely to regard the old ones as back numbers.

We owe an everlasting debt of gratitude to our old members for what they did to determine the character of our Association and for building a firm foundation on which it has stood now for nearly 70 years.

Therefore the movement to recognize a group of the older members is particularly gratifying. The Committee on Fellowship and Membership has been given authority by the Executive Board to give some special recognition to those who have been affiliated with our Association for 40 years or more. This will take the form of a certificate which will be presented by the President of the Association as a feature of the banquet at our coming meeting in New Orleans.

There are only eight such members. We would that there were more, but this desire does not lessen in any degree the honor we pay to those who are still with us.

It is almost impossible not to recall the past on an occasion of this sort. One of our number, Dr. J. H. Kellogg, became a member when Elisha Harris, a man much respected by all, was President. Another, honored all over the world and who is justly regarded as the foremost city health officer of all, is Dr. Charles V. Chapin, of Providence. He joined under the presidency of Henry P. Walcott, a noted hygienist of Massachusetts. Daniel W. Mead, the well known professor at Wisconsin, joined under Samuel H. Durgin. Jesus E. Monjaras became a member under that grand French Canadian, Frederick Montizambert. Miss Marion Talbot became a member under another delightful French Canadian, Emmanuel P. Lachapelle, of Montreal. George A. Soper became a member under William Bailey, of Kentucky, while Robert S. Weston, and William C. Woodward joined under the presidency of that noted Mexican hygienist, Eduardo Liceaga.

What memories these names bring to all who are interested in our Association and its history! Along with that group comes Henry B. Horlbeck, President of our Association on its 25th anniversary, who in season and out of season

urged the study of yellow fever. One cannot but regret that he could not live to see the triumphs which have been achieved in regard to this disease. Close along with him was Henry D. Holton who, unknown to the majority of members, frequently gave out of his private purse to help the Association. A little later came Walter Wyman, for many years the distinguished Surgeon General of the Public Health Service, and just next, Carlos J. Finlay, of Cuba, who showed his wonderful powers of observation in selecting the mosquito which has been shown to be the carrier of yellow fever, and who furnished the eggs from which the mosquitoes used by Walter Reed and his associates were reared. If we have members who do not know the history of our Association, let them read.

The length of time which these eight have been members of our Association is an inspiration. There is no question that they have found the Association useful to them and worthy of their allegiance. All have gained the highest distinction in their respective professions. They have reaped success as well as honor. What they have gained from our Association through their years of experience is open to every member. Will not their example be an inspiration to those who are now with us or who may join our ranks later?

Every member of our Association joins with our officials in doing them honor and wishing for them health, long life and additional honors.

ERADICATION OF BOVINE TUBERCULOSIS

WE have repeatedly called attention to the good work of the Bureau of Animal Industry, U. S. Department of Agriculture, in the eradication of bovine tuberculosis. This department of our government has been unceasingly active and very efficient under the direction of the Chief of the Bureau, Dr. John R. Mohler.

A recent announcement states that Nebraska is the 40th state of the Union to be certified as a modified accredited area. That a disease which has been such an economic scourge and menace to human health has been brought under control to so great an extent is a matter for congratulation not only to the department which has been responsible for the work, but to the cattle raisers and the consumers of milk. The success which has attended efforts in this direction speaks well for the soundness of the ideas upon which the campaign for eradication has been based as well as for the energy with which it has been carried out.

PUBLIC HEALTH EDUCATION*

The Last Call—See in the September issue of the *Journal* announcements of Public Health Education Headquarters at New Orleans.

If you act quickly you may yet have a share in that service to other health agencies.

Send! Come! Bring!—*Send* for Public Health Education Headquarters at New Orleans, as explained in the September issue.

Come to New Orleans if you have any part in doing health education, or in handling health education materials.

Bring with you questions you want answered; good ideas gleaned from your year's work; copies of your printed or mimeographed educational material or plans of work to be placed on the " Free " or " Give-away-table "; and a pocket display in two parts: (a) a concise but complete outline of what you have been doing; and (b) a sample set of the material you used.

Motion Pictures at New Orleans —Last year motion pictures were scheduled for display at Health Education and Publicity Headquarters. This turned out to be quite unsatisfactory.

So at New Orleans the *movies will be put on at the close of regular sessions of the Public Health Education Section.*

If you have a 16 mm. picture to be shown please quickly inform Evart G. Routzahn, 130 E. 22d St., New York, N. Y.

Do not send film to New York. Ship to Dr. C. C. Dauer as noted elsewhere under " Shipments to New Orleans." Or, deliver to Mr. Routzahn at Health Education and Publicity Headquarters.

It is hoped that every exhibitor will supply a mimeographed sheet giving a synopsis of his picture and information as to its production, cost, use, etc.

Shipments to New Orleans—Packages for Health Education and Publicity Headquarters should arrive in New Orleans by Friday, Oct. 16; should be prepaid; should be addressed as follows:

For Health Education and
Publicity Headquarters
Dr. C. C. Dauer
Tulane University
1430 Tulane Ave.
New Orleans, La.

Deliveries may be made in person at the opening of the convention if you send word to that effect. Otherwise late deliveries would disrupt the arrangement of displays.

A Sheet of Information—A mimeographed sheet of information is desired with every display at Health Education and Publicity Headquarters, and with every movie shown at close of Public Health Education Section meetings. This sheet would add much to the interest and value of any display.

Please describe the display, and

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

answer all the questions you think anyone might wish to ask about what you are showing.

Return Packing and Shipping—If you wish your exhibit returned, and if you will not be represented at New Orleans, please be very sure to arrange for re-packing and shipping. This can be done for you at small expense.

Specific information as to the disposal of your display is requested.

Three Important Events—At this time we may no more than bulletin three events of much significance to public health education.

A *Transparent Woman,* mate to the Transparent Man, produced by the German Hygiene Museum, has been brought to this country by S. H. Camp, manufacturer of Jackson, Mich. The first and only female transparent model is now being shown at the New York Museum of Science and Industry preceding a wide tour of the country.

Dr. Otto Neurath, known widely for his development of pictorial symbols for the presentation of statistics, is to be in this country for a period of several months. Dr. Neurath will attend the New Orleans convention.

The New York Exposition, announced for 1939, has at least encouraged the idea of having an adequate public health display.

Additional information about the plans will soon be available.

Publicity for Public Health Nursing—The August, 1936, issue of *Public Health Nursing* (50 W. 50th St., New York, N. Y. *35 cents*) includes a group of articles on publicity, interpretation, or education, whichever you choose to call it.

Anne M. Goodrich, Henry Street Nursing Service, tells about "Making a Movie for a Visiting Nurse Service." The experience reported offers working suggestions for other cities and other kinds of health work. Miss Goodrich thus emphasizes the value of the motion picture:

> As I have been giving publicity talks explaining the visiting nurse service this year, both without showing the film and in conjunction with its presentation, I have been very forcibly impressed with certain facts. When the talks to groups (ranging from one-half to one hour in length) have been made without the showing of the film, the questions asked by members of the audience have shown that they did not have a clear understanding of points which I had stressed. It was especially difficult to make them realize that nurses not only go into the poorer homes where the patients cannot afford to pay, but also go into the better type of homes where the patients pay for the service, either in full or in part. On the other hand, when the picture has been shown there have usually been even more questions from the floor, but these have related to points brought out in the talk and have shown almost without exception that there was a clear grasp of the objectives of the nursing service—this even though the time allotted to the entire program was only half an hour and all but ten minutes of this time was taken up by the showing of the picture. . . .

Elma Rood, associate in charge of health education, T.V.A., in "Community Health Education in Communicable Disease Control," an article to be read as a whole, suggests "steps for achieving real community planning for a health department program for the control of communicable disease."

"What Is Wrong with This?" quotes a local nursing service news report of a meeting of its supporters. On another page are listed 13 ways in which the news story is "wrong."

The issue includes "Publicity for Your Nursing Service," by David Resnick; "The Movie Problem," by E. S. Cornell; points on poster making; the use of radio (which will help advertisers much more than nursing organizations); home-made silhouette making by photography; and other articles.

Fire! Fire!! Fire!!! — Deaths through fire are akin to deaths through accidents in their interest to health agencies.

Moreover, health agencies as fallible human institutions need the stimulus of community effort to make sure that they provide maximum fire prevention for their own employees.

Hence we should have given early notice of "Fire Prevention Week," Oct. 4–10, 1936. It is not too late to do something. Write to National Board of Fire Underwriters, Public Relations Department, 85 John St., New York, N. Y. Ask for price list and samples of fire prevention material, and copy of *Safeguarding America Against Fire*.

Health Speech Contest—It has been done now and then, but we have long wondered why more is not done toward getting young people to voice health ideas and information.

Now that lively tuberculosis executive, Irma Collmer, St. Joseph County Anti-Tuberculosis League, South Bend, Ind., has gone and done it, and then told all about it.

A Christmas seal speaking contest was put on with the coöperation of the public speaking departments in the senior high schools of the county.

One of the first assignments given each student enrolling in speech classes for the fall term is a 5 minute talk on the Christmas Seal and its relation to the work of the St. Joseph County Anti-Tuberculosis League. The League supplies to each of these students an abundance of reference material, such as pamphlets on the nature and treatment of tuberculosis, and material dealing with the importance of early diagnosis and the history of the Christmas Seal. Reports of national, state, and local activities are also provided so the students have a good background of knowledge from which to select the subject they wish particularly to stress. They are also encouraged to visit the League office and to follow any leads they have relative to human interest stories.

The first week in November a committee composed of high school faculty members listen to all the talks and select the best 10 for the finals. Before the finals these 10 students are given an opportunity to polish up their talks and to gain experience in presenting them by appearing before the different sponsor rooms in the school. Thus, everyone in the high school will hear at least one of these talks and thereby become Christmas Seal conscious.

The finals are scheduled for the middle of November. The League appoints 5 judges to select the 3 prize winners. These judges are always representative and well known citizens such as the superintendent of schools, a minister, the president of the Tuberculosis League, one of the county judges, the mayor, and some representative from the P.T.A.

The prize winner gives his talk over the local brodacasting station in addition to receiving a cash award of $1. The second prize is a cash award of $.75 and an opportunity to speak before one of the local luncheon clubs such as Rotary or Kiwanis. The third prize winner receives $.50 and an engagement before some church group.

The following basis for scoring is used by the judges:

1. Material (20)
   - Knowledge
   - Judgment
   - Organization
   - Interest
2. Language (20)
   - Choice of words
   - Grammar
   - Sentence Structure
   - Pronunciation
3. Voice (20)
   - Quality
   - Inflection
   - Distinctiveness
   - Rate
   - Force
4. Communication (20)
   - Directness
   - Conversational
   - Response to audience
   - Confidence
5. General Impression (20)
   - Ease
   - Posture

The purposes of the contest are:

1. They give the students a fundamental knowledge of tuberculosis and indirectly educate the teachers and parents who are for the most part interested in the talks the children are preparing to give.

2. They afford an opportunity for newspaper publicity—announcements of the contest, the names of the participants, the names of the judges and the prize winners are all good newspaper copy. Pictures of the 3 prize winners from each high school are always run. The prize talk is usually published in the monthly school magazine and is also given before the general assembly of the high school.

3. They create a speakers' bureau. Students who participate in the finals serve as members of a speakers' committee subject to call before such groups as Parent Teacher's Associations, luncheon groups, missionary societies, and other clubs invited to ask for Christmas Seal speakers.
4. They make a close tie-up between the Tuberculosis Association and the schools.

Last year's prize speech is given in full.

In *Bulletin*, National Tuberculosis Association, 50 W. 50th St., New York, N. Y. Sept., 1936.

Libraries and Social Hygiene—A "Fourth Annual Library Number" of *Journal of Social Hygiene* continues both a demonstration and a service. A service to interested libraries, of which there are many, and a demonstration of coöperation by a national health agency.

Articles discuss the use of social hygiene material through the National Health Library, a state library, library of a social hygiene society, a large city library, a rural library, a rural church, a university library, a school of nursing, and medical libraries.

The issue includes numerous book reviews and bibliographies, and "Social Hygiene Bookshelf for 1936."

In *Journal of Social Hygiene*, 50 W. 50th St., New York, N. Y. June, 1936. *35 cents.*

From the Inside Looking Out—Objections to the use of those weasel words, "social disease," have several times been voiced by Marlen Pew. For years Mr. Pew has been editor of *Editor and Publisher*, the chief journal of journalism. On his personal page, "Shop Talk at Thirty," he said May 2, 1936:

The Public Health Service has just completed at Washington an annual conference of federal and state public health officers, one session of which was devoted to a symposium on the important subject of syphilis. A striking fact in this connection is that a number of metropolitan newspapers for the first time used the name of the disease in editorial discussions and news reports. It was fresh proof that newspaper editors generally recognize that the control of syphilis is important. No newspaper would refer to smallpox as an "eruptive disease." Yet it is just as indefinite to refer to syphilis as a "social disease" and this general practice, still followed by the major news associations and newspapers in general, interposes a real handicap to efforts of health authorities in securing the public support they should have.

Washington Daily News carried an editorial on the subject, in part as follows: "State health officers, at an annual conference in Washington, devoted a full day to discussion of the dread, widespread disease of syphilis. Here are some of the things the health officers said":

This was followed by a half dozen factual paragraphs.

Health Education in August Journal—*American Journal of Public Health*, August, 1936, includes the material noted below.

In "Modern Trends in Nursing Education," by Goodrich, note paragraphs on pages 764 and 765.

"Community Public Health Nursing in the Philippine Islands," by Dunham, pictures conditions and needs and how they are met (pages 771–777).

A thought stimulating paragraph by Henry Thomas Burke (page 785) in "Integrated Control of Occupational Diseases," by Sappington.

"Use of the Terms 'Sterile,' 'sterilize,' and 'sterilization'" (page 806) is addressed to advertisers, but may be useful to health writers and speakers.

"Venereal Diseases" (editorial, page 823) is preachment against preaching versus action.

Note, "Toward Preserving Public Health," by Patterson (page 841).

We hope that "Things in New Orleans You Will Want to See" (pages 843–847) will make more sure that you will be present at the 1936 meeting of the American Public Health Associa-

tion, and that you will use the hotel reservation blank on page 849.

New members of Public Health Education Section are listed on page 853.

Three health campaigns are mentioned on pages 856–857.

Christmas Seal Sale Publicity—It is announced that the publicity material for this year is being supplied by National Tuberculosis Association in 10 sections as follows:

Newspaper Features; Cartoons; Daily Reminders; Magazine Articles and Advertisements; Radio Scrips; Club and Radio Talks; Fillers (for Newspapers and Radio Stations); Sermon; Stunts and Suggestions; Miscellaneous. This last section contains 9 items among which is "Statistics—Up to the Minute," a recent compilation of data briefly worded, and should receive wide distribution among newspaper editors and speakers. . . .

Civil Service Exam in September—An "open competitive examination for field instructor in public health education" was held Sept. 19 for the Division of Public Health Education, State Dept. of Health, Albany, N. Y. The examination was conducted by the State Department of Civil Service.

Duties: Under direction, to supervise public health education programs with leaders of groups such as 4-H clubs, Boy and Girl Scouts, Home Bureaus, Parent Teachers' Associations, and other similar organizations; to promote and direct projects and programs in public health education in coöperation with district health officers, public health nurses, local health officers, and physicians; to address meetings and conferences on methods in public health education, and to devise new methods of disseminating accurate information on this subject; to prepare news releases, health courses, reports, and other publications; and to do related work as required.

Minimum Qualifications: Candidates must meet the requirements of one of the following groups: Either (a) graduation from a college or university of recognized standing with specialization in journalism or community organization and 3 years full-time experience in community organization and public health education involving the planning and execution of field health campaigns together with the direction of the work of others, including the preparation of material for use in newspapers, radio, exhibits, and motion pictures, at least 1 year of such experience preferably shall have been in the employ of a state, county, or municipal health department, and shall have included or been supplemented by 1 year of experience in newspaper work; or (b) a satisfactory equivalent combination of the foregoing education and experience. Additional credit will be given in rating training, experience and general qualification requirements for completed courses in public health or other college work which bears directly upon preparation for work in the public health field.

Subjects of Examination:

Written examination on the knowledge and skills involved in performing the duties, relative weight.............. 4

Training, experience and general qualifications, relative weight........... 6

Please send other civil service examinations in health education, and question lists for the same. We would like to display at New Orleans.

Hygeia, September, 1936 — Here are titles and topics, source material, and reprint material. *Hygeia,* 535 N. Dearborn St., Chicago, Ill.

Health examinations before marriage (what and why) . . . Undulant fever (origin and spread) . . . Uses of snake venom . . . Safety in the home . . . For the school lunch box . . . Vaccination of Napoleon's army . . . The physical superiority of college students . . . The play way to health and long life . . . William Crawford Gorgas . . . Home study . . . The passing of disease (30 years of medical progress) . . . Balancing the physical basis ("insurance" value of preventive medicine) . . . What you should know about cancer . . . Typhoid bacilli . . . Food, drug and cosmetic racketeers . . . The Martin Family vacation (testing the well; shallow wells and rural nurses) . . . New books on health . . . Healthgrams . . . Questions and answers.

In "School and Health":

What is adolescence? . . . Health lessons from real situations (the flood in Lowell, Mass.) . . . Planning your safety program in

September . . . Art in the service of health (the first of a series).

They "Say It With Pictures"—A full page of reproductions of newspaper clippings illustrates how Red cross chapters utilize varied activities and circumstances to provide pictures and text for newspaper use. See *Red Cross Courier,* Washington, D. C., Sept., 1936.

We would welcome similar specimens from health agencies. Good use could be made of such contributions for display at the Annual Meeting, and in this department of the *Journal.*

When Dietetics May Be Fun—Minnesota 4-H Club boys were asked what they liked to eat. *Farmer's Wife* presents the results for their girl readers. The article talks about "good eats," but a similar approach might be made through other groups of young people, and the "findings" could be served with an added dressing or sauce of dietetic application. It is one way to unconventionalize our health teaching.

Probably our fellow member, Carroll P. Streetor, *Farmer's Wife,* St. Paul, Minn., will send upon request a copy of this September, 1936, issue, containing "Girls, Here's What the Boy Friend Likes to Eat."

A Talking Slide Film—A new slide film is announced under the sponsorship of the American Social Hygiene Association.

The special subject of the production is syphilis, and the title is For All Our Sakes. Attractively phootographed, and accompanied by a voice recording of unusual variety and vividness, this new presentation should be decidedly effective as a means of informing the lay public, which it is particularly designed to reach.

The film and record (disc) have been prepared for use with any standard "talking slide" machine. In general this lecture may be shown to any audience at any time simply by telephoning the Western Union Telegraph Company, which handles the equipment and operation of such productions in the principal cities of the country. The Company's inclusive charge for this service is $10 per showing. The production can also be leased directly through the association by the day, week, month, or year. For terms and other details inquire at the association's office at 50 West 50th Street.

"Health Education for 4-H Clubs"—A 7 page mimeographed bulletin with this title has been issued by Coöperative Extension Work, Ithaca, N. Y. The pamphlet lists 3 steps in planning a county 4-H health program. Topics suggested for 1936–1937 are divided between discussion topics, and demonstration-participation topics.

An outline of teaching methods precedes paragraphs descriptive of the suggested topics.

Added is a page of "topics suitable for discussion with leaders and other adults."

The pamphlet is a coöperative project of the Public Health Education Division of New York State Department of Health. Address W. J. Wright, State Club Leader, Ithaca, N. Y., for a copy.

"Owing to the Increasing Demand"—What is your policy as to requests for printed matter from teachers and individuals, not health workers, living outside your city or state? The mention of publications in radio broadcasts, and the numerous mimeographed and printed reference lists which include mention of local and state educational material has increased the out of bound requests for single copies and quantities.

The Massachusetts Department of Public Health sends the following mimeographed statement:

In response to your request we are sending sample copies of the pamphlets desired, to be used for reference purposes. Owing to the

increasing demand for our printed material it is impossible for us to send additional copies outside the state. We would be glad to have these publications reproduced by local organizations wishing to use them if credit is given to this department.

Your own state department of health would probably be glad to supply pamphlets on health, or they may be obtained from the U. S. Public Health Service, or the Children's Bureau at Washington, D. C.

Why Not in the U. S. A. and Canada?—Something better than dolls in exhibits is mentioned in a letter from China, and illustrated in Sept., 1936, issue of *American Journal of Nursing*, 50 W. 50th St., New York, N. Y.

I was very much interested to read in one of the issues of the *Journal* of a nursing exhibition and especially of dolls representing the history of nursing. We tried a similar project but talent failed sufficiently to alter any dolls we could find, so in the end we made plasticine models. Some of the limbs were sadly out of proportion but we felt that on the whole the models could be voted a success.

Dolls in displays are likely to be distractingly "cute," or unconvincingly doll-like. Desirable substitutes are the plasticine figures (or other material used in the schools), or mounted and cut-out photographs or sketches.

They Believe in the Health Department—Says Dr. J. O. Nall:

Within recent months I have had occasion to talk with a number of representative citizens concerning the full-time county health department and the activities of its personnel—health officer, public health nurse, and sanitary inspector. I have made no special effort to pick the people with whom I talked, other than to select persons whose family life or business would naturally bring them into contact with the county health workers.

Among those with whom I talked were a farmer, a dairyman, a country store keeper, a widowed mother with three children in school, a rural school teacher, a restaurant operator, a policeman who had killed several dogs suspected of being mad, a soda fountain clerk, a woman suffering from active tuberculosis, and a citizen of a county which does not have a full-time county health department. One general question was put to each of them: "Have you or your family benefitted by the full-time county health department; if so, how?" Some replied that they could not think of any special benefit other than that their children had been given "shots" at school against diphtheria, smallpox, and typhoid fever. Others immediately mentioned activities of the health authorities from which they had derived definite and specific benefit. These included the 10 enumerated above.

Then follows the testimonies of "The Farmer," "The Dairyman," "The Widowed Mother with Three Children," "The Soda Fountain Clerk," and others, as reported in *Bulletin*, State Dept. of Health, Louisville, Ky. Aug., 1936.

The Farmer said:

"I was opposed to smallpox vaccination until the health department was organized here. I had refused to have my children vaccinated because I couldn't see that vaccination made any difference. Then, one day, the health officer made a special trip to see me and talked to me the better part of the afternoon, explaining the history of smallpox and smallpox vaccination and showing how it had controlled the disease. He convinced me that I knew nothing about smallpox or vaccination against it. I decided that if the health officer could afford to spend so much time talking to me about vaccination, I could afford to change my mind." He added, with pride, that he had since convinced several of his neighbors of the need for general vaccination against smallpox and helped to secure the vaccination of every school child in his district. . . .

Has anyone else carried out this fine idea?

DATES AHEAD

Use past events to talk for you, as well as the present, and the future.

National historical dates and local dates of many types offer chances for dignified tie-ups with health ideas or health organizations. Editors will welcome your good ideas, especially when they bring new angles on some

of the over-worked dates which cannot be ignored.

Fire Prevention Week, Oct. 4–10, 1936, will come a year from now at about the same time. Make it a date even if it is too late to make use of it this year. See "News Almanac for Social Work" (Community Chests and Councils, 155 E. 44th St., New York, N. Y. *50 cents*) for specific suggestions.

Columbus Day, Oct. 12, may be a time for reporting "discoveries" in the health field, possibly in local conditions as suggested in the "News Almanac." How about a "Health Columbus" in your city?

Association of Junior Leagues (see the "Almanac") birthday, Oct. 18, may be a time for some testimony to the help to local health activities given by the local league. Or, a time to suggest that the league consider some health education activity.

Most important of all will be the sessions of Public Health Education Section at New Orleans, Oct. 20–23, 1936.

Girl Scout Week, Oct. 25–31, includes Saturday as Health Day.

The 1936 Mobilization for Human Needs includes numerous national publicity features intended to support the local chest money raising activities throughout the country. In most cities health agencies have a definite stake in these campaigns.

American Education Week, Nov. 9–15, offers an opportunity for health agencies to participate.

Red Cross Roll Call starts Nov. 11 when Red Cross health activities should receive special attention.

Annual celebration of the founding of The National Committee for Mental Hygiene, Nov. 12, is a time for accenting the new day for the mentally sick. Is your city doing its part?

The unlucky day made "lucky," Friday, Nov. 13. The "Almanac" suggests a human interest story about some success in health service, begun or ended on this day.

National Book Week, Nov. 15–22, may be a time for playing up the health service of books, or the health books available at the health department, or the health books to be found in different local libraries, or the giving of health books to institutions and centers where they might get a wide reading, or a display of health books at the public library or in a book shop.

The first local organization of what later became known as the Y.W.C.A. was founded Nov. 24, 1858. Another opportunity for health agencies to devise ways of expressing appreciation of the health activities of a local organization.

Thanksgiving Day, Nov. 26, suggests contributions toward a healthful Thanksgiving, or publicly expressed thanks for gains in health conditions and health activities.

Christmas Seal Sale, opening Nov. 26, means both money raising and health education.

See the back pages of this issue of the *Journal* for list of conventions and other events, many of which offer opportunities for local health education purposes.

If you have suggestions on any of the above please write to us. If you seek suggestions, or if you don't fully understand any statement in the foregoing, please write.

BOOKS AND REPORTS

An American Doctor's Odyssey—*By Victor Heiser, M.D. New York: Norton,* 1936. 544 pp. Price, $3.50.

When, on May 1, 1898, Admiral Dewey sailed into Manila Bay, he added enormously to American prestige, as well as territory to America, but he also gave to America the grave responsibility of caring for a rather heterogeneous population scattered over an archipelago extending over a thousand miles from north to south, a population which, as regards advancement in modern ideas, had slumbered peacefully for many years under Spanish rule. He gave to us a people among whom many of the notable scourges of the world were endemic. Here was a laboratory for investigation and rich ground for field trials. Without disparaging the work of sanitarians and scientists in other parts of the world, it is not too much to say that the demonstration given in the Philippine Islands stands as a monument to preventive medicine.

The man who had much to do with every phase of this regeneration is the author of this book, which is a record of his achievements. After some preparation in the immigration service of the United States in Naples, he was appointed Chief Quarantine Officer of the Philippine Islands, and later Director of Health. The officers of the American Army, upon whom this duty devolved from the military standpoint, had had little experience in dealing administratively with tropical diseases. In 1902, Drs. Gorgas and Heiser were sent to the International Congress on Medicine in Cairo, where they met officers of many nations who had experience in the administration of health in the Orient and tropics. They were met everywhere with the reiterated statement that it was a waste of time to try and sanitate Orientals, who wished to be left to their old unhealthy habits. Life was cheap in the Orient, and apparently it had not occurred to the employers of colonial labor that much money could be saved by improving the health of their employees and in lessening the death rate.

The conditions which confronted Dr. Heiser were anything but conducive to optimism—years of insurrection, discontent and discouragement, inefficient government, and a declining scale of living, with little hope for the future. Plague was rampant. The morgue was piled with dead bodies of cholera victims. Forty thousand were dying each year from smallpox. Tuberculosis caused 50,000 deaths a year. Sufferers from beri-beri numbered tens of thousands. Every other child died before its first birthday—the highest infant mortality rate in the world. There were 10,000 leprous men, women, and children. Venereal diseases were widespread. There was much insanity. The different types of malaria were everywhere. Manila was overcrowded. Six to eight slept in rooms hardly large enough for one. There was an antiquated and polluted water system built by the Spaniards, but there was no reservoir, not a pipeline, and not an artesian well. There were practically no sewer systems. The vilest class of food products was shipped into the country; perishable foods were sold from the ground; no proper inspection

of animals was made before slaughter, and diseased cattle were regularly marketed. The people were strongly imbued with superstitions and traditions, apparently contented with their lot and resigned to their illnesses. In spite of this discouraging picture, Dr. Heiser set for himself the goal of saving 50,000 lives a year.

Chapter after chapter gives accounts of how one bad condition after another was met, how one disease after another was conquered, how superstitions were overcome and hope for the future was instilled into the inhabitants of the many islands.

The head of one chapter, "Washing up the Orient," tells the story. America was literally "Washing up the Orient."

This book might well serve as a textbook on preventive medicine. A good history of each disease is given, and the methods of handling it are described. How anyone can read of the results accomplished and doubt our control over epidemic diseases, even under the difficult conditions described, passes understanding. Argument is not needed. The facts speak more loudly than language. When 300 savage Moros, fully armed, come and demand vaccination because of their observation of the freedom from smallpox enjoyed by their fellow men who had been vaccinated, we feel convinced that there is hope for any part of the world in preventive medicine.

This book would also be useful as a study in sociology: It is a demonstration that philanthropy pays dividends. By 1914, *the great pestilences had been* brought under control. The Filipinos as a nation were advanced in convalescence, and a permanent health organization was established.

Among the difficulties encountered, not the least were those due to various religions, a striking example of which is given in the replies of a Mohammedan chief to a medical man:

"What's your death rate?"

"It is the will of Allah that all die; some die young, some old."

"What's your number of births?"

"Allah alone can say."

"Is your water safe and potable?"

"History records no death from thirst."

"What is the hygienic condition of your village?"

"Allah sent Mahomet who proved the truth with fire and sword. Now, Lamb of the West, cease your questioning. It can do you or others no good."

The book is most entertainingly written. It contains many anecdotes, some of which test one's credulity. Certainly no story loses anything in the telling. There is Ibayat, rising sheer from the sea, surrounded by a circular rim which not even a goat could climb, and up which those trying to land must be hauled in a basket suspended by a vine, yet the inhabitants raise cattle and export them, getting them to ships by forcing them over this precipice into the water. We keep wondering how the original inhabitants and the original cattle reached this unapproachable haven!

The whole book tells the story of remarkable achievement, and demonstrates to us what can be done by knowledge put into action by an able, alert, and aggressive man backed by illimitable funds. The author has an apt way of summing up with succinct sentences which are worth pages of argument, for example: "There are very few anti-vaccinationists now in the Philippines. Most of them have died of smallpox." The Tamils, "with *hardly a smile in the entire race*" because of hookworm, were given successful mass treatment, and "At last the Tamil smiles."

There are certain statements which are unfortunate, especially as the book is for the general public. The author speaks of the "Pasteur treatment for hydrophobia," which will give the layman an entirely wrong impression. We

are told that the Negro has an undivided cartilage at the end of the nose, and that this peculiarity, which extends even to octoroons, is a sure test of Negro blood. The authority for this statement has not been found. It is not true of the Negro in this country. The identity of yaws with syphilis is not recognized, in spite of the successful treatment with salvarsan.

The book can be recommended from many standpoints. The interest of our readers lies chiefly in its public health aspect. Others will find in it a book of travel and adventure; still others a history of the races of the world. It is boundless in its interests; there is something for practically every class of reader. MAZŸCK P. RAVENEL

Don't Be Afraid—*By Grace Adams. New York: Covici-Friede*, 1935. 188 pp. Price, $2.00.

An interesting and instructive book from the author of *Your Child Is Normal.* Fear as a protective, biological mechanism is not the crippling emotion most people conjure up at the mention of the word. Fear has its place and uses, but fear of fear has no rightful entry in our everyday psychology. Odd quirks, foibles, fads, and phobias are mental bed-fellows with intelligence, discretion, and quite often, genius. Dr. Adams lists a group of the world's famous and their less-famous parataxic reactions.

The psychologically strong are not so because they lack weaknesses but because they have overcome or used them to advantage. The bogie of superstition is born in the infancy of the individual and in the untutored, primitive emotions of the race.

The chapter on The Modern Conscience gives valuable advice which might be stated tersely—know thyself. Self-knowledge breeds respect and consideration for others and fosters understanding, tolerance, and group adjustment. Fear loses much of its paralyzing effects when brought out into the open and discussed in the simple, sane way which we have come to expect of the writings of Dr. Adams.

MAURICE A. R. HENNESSY

My Life and Work—*By Adolf Lorenz, M.D. New York: Scribner*, 1936. 362 pp. Price, $3.50.

Dr. Adolf Lorenz has written an autobiography which is interesting and at the same time most revealing. Its interest lies in the well sustained narration of the experiences of a life of accomplishment, which, starting in a humble peasant cottage in Silesia, reached its climax in the capitol city of Vienna with the title of Professor Extraordinarius, the Order of Hofroth, and world fame. Dr. Lorenz writes most interestingly and intimately of all phases of his struggle from obscurity to international prominence; but only in those chapters dealing with his early life and struggle for an education does he fill in the details of his growth and progress. The years of his professional development are painted in bold strokes and give but a vague picture of the steps by which a local practitioner of bloodless surgery became a world figure. It would seem, however, from what is revealed of the struggling boy and medical student that an alert mind, a firm determination to succeed, backed by energy and perseverance, self-confidence, and a winning personality were the materials with which a most distinguished career was built.

The revealing side of the book lies in its frank egoism and egotism. That Dr. Lorenz gave himself undue supremacy in his thoughts is evident from the very beginning of the book; that he gave himself undue prominence in speech becomes a conviction as the last word is read. That Dr. Lorenz contributed greatly to the advancement of orthopedic surgery is unquestioned.

That he was a super man, accomplishing cures that were beyond the skill of others is open to debate. Yet his words can leave no other impression than that he felt that he stood out above all others of his guild. This weakness in a really great character is demonstrated by the fact that in a book of 353 pages, only 108 of them are devoted to his early life, his development, and his arrival at his goal of professorship. The remaining pages are given over to the description of his accomplishments at home and abroad.

Dr. Lorenz in his life story reveals a very human personality. He shows himself a strong and sturdy character, who in spite of his naïve vanity, compels respect by his determination to succeed, his ability to do so, and his contributions to medical progress. That he had a deep sympathy for those physically handicapped is shown by his great kindness toward crippled children and his ever ready willingness to help them to the limit of his ability whether they were princes or paupers. That he had a strong heart is evident, for deprived of a promising career in general surgery because of his sensitiveness to carbolic acid, the then universal antiseptic, he built on its ruins a brilliant career in bloodless surgery. The life of such a man is well worth knowing. It is an interesting story of accomplishment and success in a country and in times when the low born and poor had but little opportunity for advancement, and so it has lessons to teach as well as pleasure to offer.

FRANK D. DICKSON

The Jew in Science—*By Louis Gershenfeld. Philadelphia: The Jewish Publication Society of America*, 1934. 224 pp. Price, $2.75.

One cannot merely review this book from the viewpoint of composition and content, but is rather impelled to ask, "why was it written?" The author anticipates and answers the query, by saying that it had been his hobby to collect notes on "the history of science, Judaism, and scientists." The publication of the accumulated material, however, the author warrants on the basis that "there are some Jews of high standing, in addition to non-Jews who claim that the Jew does not share or do well in the sciences."

To counteract this impression the author devotes 87 pages to The Beginning of Civilization; a Brief History of the Jewish People; Science and the Jewish Scientist until the Dark Ages; The Dark Ages until after the Death of Maimonides; Other Incidents during the *Middle Ages and until the Nine*teenth Century; Renaissance. The remaining 138 pages of the book are almost entirely devoted to an uncritical listing of the names of Jews, half Jews, and converts, in the various divisions of science.

The historical portion is sketchy to the point of being a catalogue of names and dates, with only thin circumlocutions to tie them together into the semblance of a narrative. The second portion would make an excellent "index expurgatorius" for an American Hitler.

There is something incongruous in a work devoted to the Jew in Science, which carries the subject beyond the late Renaissance and into the modern period. It is the boast of learned men that science is international, that its devotees form a true brotherhood, that the accidents of birth, color, race, religion, are without note in its realm. There are only scientists, not Christians *in* science, Mohammedans *in* science, Jews *in* science.

Unquestionably the scientist does not shed his innate religious and racial qualities, as he enters his "laboratory." Metchnikoff, a half Jew, half Slav, differed in his personality, and in his approach, from his Breton, Catholic,

predecessor, Pasteur, who differed radically from his contemporary, Robert Koch, the German. There is a history to be written on the influence of the racial characteristics of the scientists on the development of science. The impediment is the definition of the meaning of race, an impediment greater as it pertains to the Jew, than to say the German, the French, or the Italian.

The Jew in Science does not deal with the unique contributions which Jews made to science, *because* they were Jews. It merely lists the names of Jews in science, and tells very briefly under what adverse circumstances they pursued their scientific work. It is too condensed to serve as a history. It may perhaps convince some of its readers, who need that conviction, that the Jew does share in, and does well in the sciences. IAGO GALDSTON

Plague. A Manual for Medical and Public Health Workers—*By Wu Lien-Teh, M.D., J. W. H. Chun, M.D., R. Pollitzer, M.D., and C. Y. Wu, M.B. Shanghai, China: National Quarantine Service,* 1936. 547 pp. Price, $4.00.

There has come to us from China a book on plague which is quite unusual. The senior author was formerly Director of the Manchurian Plague Prevention Service, and is well known for his writings, especially those on the various aspects of plague, including its prevention. Drs. Chun and Pollitzer were formerly associated with the senior author in the Manchurian Plague Prevention Service, and are now in the Quarantine Service at Shanghai. Dr. Wu is connected with the National Quarantine Service and is Senior Quarantine Officer at Shanghai. All four authors have had extensive experience with plague from every standpoint, and the book they have produced is authoritative.

The history of the disease, hosts and carriers, and epidemiological factors are from the pen of the senior author; bacteriology, immunology, pathology, and laboratory diagnosis are by Dr. Pollitzer; insect vectors, prophylaxis and management of epidemics, and ship-borne plague are by Dr. Wu; while Dr. Chun has been responsible for the clinical features, therapy, and personal prophylaxis. They have evidently worked in close association and there is an evenness of treatment sometimes missing from a book produced by several authors.

The authors state that they have kept constantly in mind the needs of medical and public health workers, and while some material of highly technical nature has been included on account of its value to advanced students, their chief object has been to provide a practical guide for the prevention and treatment of plague. The many people all over the world who are familiar with the writings of the authors need not be told that a thorough canvass has been made of every source of information.

It is held that the oldest and most active of the endemic areas of the world are within or adjacent to the Central Asiatic plateau, which constitutes the ancestral home of plague. The idea that North Africa and areas in Eastern Central Africa were the early foci is held to be without sound foundation.*

The authors believe that, taken as a whole, the changes are favorable for a continued survival of the plague virus. Under favorable conditions, infection may persist for long periods in one place. Rats are not given to extensive active migration, but are passively carried by ships and other means of communication to very distant points. Infected fleas may also play a significant part, being carried by man and certain

* This is discussed at length and in detail in *Manchurian Plague Prevention Service Memorial Volume*, 1934.

types of merchandise to widely scattered regions. In areas in India which experience regular outbreaks during the plague season, the disease persists in rats during the off-season in limited localities. At present there are 27 principal foci, most of which are in the East, although the Hawaiian Islands and the United States contain foci of infection. In the Rocky Mountain region of the United States a wild rodent plague, to which the name "selvatic" plague has been given by Jorge, shows a disquieting tendency to spread and new foci have been found in this district very recently.

There is a general retrogression of the present pandemic. Curiously enough, Europe, which in the past has been a favored home of pandemics, has become almost impregnable to the current wave of infection. The authors hope that improved standards of living and housing, together with the laws of nature, will render other regions unfavorable to major inroads of plague.

From our standpoint, the epidemiology of the disease is the most important feature, since upon this depend prevention and the management of epidemics. General prevention of the bubonic type of the disease is based upon its relation to rodents and their ectoparasites. Man's contact with the infection depends chiefly on contact with the rat and its fleas, and his chance of escape from the scourge is conditioned upon the effectiveness of the campaign against these vermin. While the authors make this broad statement, they recognize fully the rôle of the ground squirrel in California and other rodents in some parts of the world, especially, for example, the tarabagan of Mongolia and Transbaikalia, and the susliks of South-Eastern Russia. The authors agree with Deprat that "the doctrine of rat and flea guilt forms the keystone of the arch of international sanitary defense against plague," but also with Heiser, who holds that the "control of the disease depends upon preventing rat-fleas that have bitten plague-infected rats or human beings from biting man." They point out that the natural spread of the disease is greatly retarded because rat-fleas do not bite man by choice, but only after failure to find their proper host.

The book is profusely illustrated with half-tone plates, maps, charts, figures, and some color plates. All names of persons, diseases, parasites, and many illustrations are given in the Chinese characters as well as in English. The scientific names of insects and rodents are also given in italics. There are interesting tables, one giving a list of the pestilences in China from 224 B.C. down to the present time. Each chapter is followed by a well selected bibliography. Altogether, it is hard to speak too highly of this book. All of the authors write exceptionally good English. The book is up to date, even including some references in 1936. The printing and binding are excellent.

MAZŸCK P. RAVENEL

Hospital Organization and Management—*By Malcolm T. MacEachern, M.D. Chicago: Physicians Record Company*, 1936. 944 pp. Price, $7.50.

The increasing relationships of hospitals with public health work render this book of considerable interest to health administrators. Dr. MacEachern, as director of hospital activities of the American College of Surgeons, has had unique opportunities to become familiar with hospitals throughout the United States and Canada, and he has drawn upon his wealth of experience in compiling this substantial handbook for executive officers of medical institutions.

After a brief review of the history of hospitals and of the problems of planning and building new ones, the general

organization of a hospital is described. A series of chapters is then devoted to the professional and administrative departments. The book enters into technical detail of practical value in the day's work of the administrator, but does not fail to enunciate general principles also. Considerable attention is given to the community relations of the hospital, and to methods of public education. Relationships with public health departments fill only a few pages. Much more might have been said on this subject in connection with the laboratory and out-patient services. Care of communicable diseases is dealt with and the development of satisfactory facilities for them in general hospitals. The numerous copies of forms, "standards," and standing orders are a useful feature of the book.

Little attention is given to the special problems of the small hospital in the town or rural community, a matter to which many health officers are now giving considerable thought; but it must be borne in mind that this is a handbook of institutional management rather than a guide to public policy.

MICHAEL M. DAVIS

Outline of Town and City Planning—*By Thomas Adams. New York: Russell Sage Foundation,* 1935. 368 pp. Price, $3.00.

This volume is largely based on a course of lectures delivered to students of the Department of Architecture of the Massachusetts Institute of Technology over a period of 11 years. A brief description is given in the introduction of the meaning and scope of city planning in relation to modern practice. Part I reviews the character of early efforts in the planning of cities down to the middle of the 19th century; Part II describes developments in the United States and other countries since about 1830, concluding with a discussion of modern methods and aims, and of some considerations relating to the future; while the Appendix summarizes many aspects of the subject which the city planner may have to consider. Logical arrangement of subject matter and enlightening information regarding community planning procedures, characterize this volume which should be a useful source book for city officials, including health administrators, as well as those specifically engaged in planning and zoning departments.

City and town planning is defined as a science, an art, and a movement of policy concerned with the shaping and guiding of the physical growth and arrangement of towns in harmony with their social and economic needs.

> We pursue it as a science to obtain knowledge of urban structure and services and the relation of its constituent parts and processes of circulation; as an art to determine the layout of the ground, the arrangement of land uses and ways of communication and the design of the buildings on principles that will secure order, health, and efficiency in development; and as a movement of policy to give effect to our principles.

The suggestion is made that the tempo of traffic that has arisen in the cities of all countries has caused traffic problems to be overemphasized in town plans; but it is being more and more realized that solution of the evils of congestion by means of communication cannot be achieved without orderly control of building designs, uses and densities, and the provision of ample spaciousness for health and recreation in the surroundings of homes and places of work. Furthermore, the plan of a new town may, on the whole, be approached without the limitations which affect replanning. "Much that can merely be mended in the existing community can be prevented by foresight in the new community." The author suggests the term "civic design" to distinguish the art of city planning from the act or machinery of making plans, and emphasizes that a plan is only a

means to an end, and that end is a stable and well balanced physical structure so designed as to secure health, safety, amenity, order, and convenience, and, generally, to promote human welfare. IRA V. HISCOCK

Your Germs and Mine: The Story of Good and Bad Microbes—*By Berl ben Meyr. Garden City: Doubleday, Doran,* 1934. 389 pp., 34 ill. Price, $2.75.

The title page contains a quotation from Dr. Logan Clendening; the book is dedicated "To Koch's Bacillus)"; acknowledgments are made to 65 persons, including novelists, columnists, and an authority on the psychology of sex; and there is a foreword by Dr. Albert Einstein. In a foreword of his own, the author explains that while "the human drama lurking within bacteriological research already has established itself as a theme in modern literature," he proposes to portray "the critical part played in human affairs by the bacteria themselves."

With so much said by way of introductory explanation, one would expect to find some assurance that the information is authentic, but none is given. Nor are there references in the text by which the lay reader can confirm or follow further the information set forth. Inasmuch as the author does not attempt to promote any new theory or upset any established fact, but merely to interpret what may be regarded as orthodox doctrine, perhaps this does not greatly matter.

Among the 13 chapters are the following: The Nature of Microbes; The Microbes in Dust, Air, Sewage, and Water; Milk and Its Microbes; Microbes in the Home; and Microbes in the Prohibition, War and Other Industries.

About a dozen diseases are taken up and dealt with specifically. Here there are a few minor slips. Turning to Chapter VIII, the reader finds the statement that "practically every urban center in the United States has a crop of typhoid fevers in the late summer and autumn," due to infection contracted while on vacation, but on the next page a statement appears to the effect that among 81 of the larger cities there were 9 without a single typhoid death for 1 year, and 6 with a population of one million or more with less than 2 per 100,000.

The author declares that typhoid carriers "probably have a chronic infection in the intestinal or genito-urinary tract, which continues to discharge virulent microbes," but says nothing about infections of the gall bladder.

In the section on water supplies there are also several slips, as where inspection of the sources is omitted from an account of the ways in which the question of the purity of a water supply can be estimated. And in the matter of water analysis, the great significance which may attach to the quantitative determination of chlorine seems to be misunderstood by the author.

Intended for the popular mind, there is little in this book that the health officer of today has not learned in his days of training or cannot readily get from authoritative sources in his library.

GEORGE A. SOPER

Bibliography in Health Education for Schools and Colleges—*By Mary Ella Chayer, R.N., A.M. New York: Putnam's,* 1936. 100 pp. Price, $1.50.

"The purpose of this bibliography is to offer to the classroom teacher and to the special teacher or health education supervisor a wide variety of source materials from which to select library materials."

Though this is a fair bibliography of the field of health education, there seem to be certain serious deficiencies. In

the field of play, it would be interesting to know why Joseph Lee's *Play in Education,* a text 13 years old, was chosen in preference to Mitchell and Mason *The Theory of Play,* modernized and published in 1934.

The necessarily brief descriptions of content are in some cases seriously misleading.

Why was the outstanding periodical in this field, *The Journal of Health and Physical Education,* omitted from the list?

The classification of texts has been carelessly done. One that has received several state and numerous city adoptions as a high school text is listed as a college text—advanced—and the name of one of the authors is omitted.

There is probably no other field of publication in which the work is so poorly done as in that of bibliography.

CHARLES H. KEENE

How Life Begins—*By George L. Bird. Chicago, Ill.: The Book House for Children,* 1935. 117 pp. Price, $1.00.

Explaining the beginning of life to children is still one of the most difficult tasks the parent faces. Nor do books written to aid the parent in this duty always prove of much assistance. It would seem, however, that the one under review might furnish the needed aid, especially if the children to be instructed have some acquaintance with country life.

The plan of the book is a simple one. Starting with the beginning of plant life as represented by the yucca, it progresses in eight chapters through bird and lower animal life to the story of reproduction in man. The subject is handled simply, the stories which carry the information are interesting, natural and appealing. Parents and children both will appreciate this book intended for children from 6 to 10 years of age.

M. E. CHAMPION

Tuberculosis—*By Gerald B. Webb, M.D. XVI of the Clio Medica Series, edited by E. B. Krumbhaar. New York: Hoeber (Medical Book Department of Harper),* 1936. 205 pp. Price, $2.00.

This little volume is a valuable addition to the library of tuberculosis in that the author presents in terse readable form a compact historical survey of his subject that makes the facts readily and entertainingly available to the general practitioner, the medical undergraduate, and the interested layman. A monotonous chronological presentation is avoided by division of the history into epidemiology, the knowledge of the ancients, the middle ages, contagion, pathology, the tubercle, the tubercle bacillus, immunity, diagnosis, treatment, rest treatment of tuberculosis, climate, sanatoria, and legislative prophylaxis. Apt quotations preface and conclude the separate chapters. Certainly the wise and busy physicians cognizant of the value of a historical background in treatment and diagnosis must spare a short hour or two for this little handbook and possibly a second period for a profitable re-reading.

LAWRASON BROWN

Stamp Out Syphilis!—*By Thomas Parran, M.D. Survey Graphic, July, 1936. Reprints are available at 10 cents per copy. Also enlarged facsimiles of pictographs. Quantity rates from Survey Associates, 112 East 19 St., New York, N. Y.*

Following closely on the list of "Musts" in public health work attributed to Surgeon General Thomas Parran of the Public Health Service, comes a striking article by him featured in the *Survey Graphic* which is being widely distributed throughout the country.

The writer says that syphilis bids fair to become the great American disease, though the figures given indicate that

it may have already taken this position. He scores our apathy and the "hush-hush" policy which we have followed, to which he attributes a large part of the spread of the disease. He tells of "Damaged Lives," an excellent moving picture adapted from the German by the American Social Hygiene Association for educational purposes, yet its public exhibition was forbidden in New York State, and only in New England and a few states could it be shown freely.

After a description of existing conditions, he states positively that our ability to control syphilis is greater than that for tuberculosis or typhoid fever, both of which diseases we have controlled to an extent hardly believed possible a few years ago. He backs this statement by the experience of Sweden, Norway, and Denmark, with a combined population nearly equal to that of New York State, yet all told they have about 1,600 cases of syphilis a year, while in New York State, exclusive of the City, last year there were 21,984 cases under treatment. In New York City, there were 1,836 new cases in one month. In the whole of Sweden, with practically the same population, only 431 occurred the entire year. While the Scandinavian countries are outstanding in their control of this scourge, America seems to be behind a number of other countries in many administrative features. Various methods of case finding and early control are discussed, as are legislation and education. Dr. Parran holds that the control of syphilis is not the business of the public health officer, the physician, and social worker only, but the whole people must be interested and take an active part. He lays down 5 things which obviously should be done, and ends by saying: "Syphilis must be the next great plague to go. We must attack it now."

MAZŸCK P. RAVENEL

BOOKS RECEIVED

FACTS AND FRAUDS IN WOMAN'S HYGIENE: A Medical Guide Against Misleading Claims and Dangerous Products. By Rachel Lynn Palmer and Sarah K. Greenberg, M.D. New York: Vanguard, 1936. 311 pp. Price, $2.00.

GROUP DISCUSSION MATERIAL ON ACCIDENT PREVENTION—ON THE FARM, IN THE HOME. Washington: The American National Red Cross, 1936. 79 pp.

HANDBÜCHEREI FÜR DEN ÖFFENTLICHEN GESUNDHEITSDIENST. Vol. 6, ORTSHYGIENE BÄDER UND KURORTE. By H. Lehmann and H. Vogt. Berlin: Carl Heymanns Verlag, 1936. 247 pp. Price, RM. 13.

LABORATORIO DE ANÁLISIS DE AGUAS Y DE INVESTIGACIONES SANITARIAS. Informe Anual de 1935. Caracas: 1936. 117 pp.

MATERIA MEDICA AND THERAPEUTICS: A Text Book for Nurses. (6th ed., rev.) By Linette A. Parker. Philadelphia: Lea & Febiger, 1936. 377 pp., ill. Price, $2.50.

WHY QUIT OUR OWN? Offering an American Program for Farm and Factory. By George N. Peek with Samuel Crowther. New York: Van Nostrand, 1936. 353 pp. Price, $.50.

HISTORY OF COUNTY HEALTH ORGANIZATIONS IN THE UNITED STATES, 1908–1933. Compilation by John A. Ferrell, M.D., Dr.P.H., and Pauline A. Mead. Public Health Bulletin No. 222. Washington: U. S. Public Health Service, 1936.

INTERNATIONAL LABOUR ORGANISATION AND SOCIAL INSURANCE. By the International Labour Office. London: P. S. King & Son, Ltd.,. 1936. 219 pp. Price, $2.50, cloth, $1.50, paper.

THE RISE OF MAN THROUGH HIS HANDIWORK: Why Are We Right-Handed? By David Reisz. Cleveland, Ohio: Better Education Association, 1936.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Rural Health Units Increase—Recounting the modest gain in rural full-time health units: 71 net for 1935, making 612 in all.

ANON. Extent of Rural Health Service in the United States, December 31, 1931, to December 31, 1935. Pub. Health Rep. 51, 33:1117 (Aug. 14), 1936.

Nasal Instillations and Poliomyelitis—Further experimental evidence is presented to indicate the prophylactic value of picric acid-sodium aluminum sulphate mixture against poliomyelitis and encephalitis.

ARMSTRONG, C., and HARRISON, W. T. Prevention of Intranasally Inoculated Encephalitis (St. Louis Type) in Mice, and of Poliomyelitis in Monkeys by Means of Chemicals Instilled into the Nostrils. Pub. Health Rep. 51, 33:1105 (Aug. 14), 1936.

Medicine and Hygiene—Nine good reasons and true why the physician should be the central figure in the public health program.

BAUER, W. W. The Physician's Place in the Health Program. J.A.M.A. 107, 7:485 (Aug. 15), 1936.

Health Work that Pays Cash Dividends—Arriving at the conclusion that efficient industrial health and safety services will save the employer $12,000 per 1,000 employees per annum, and will save the employees half as much again, the obvious social advantages of adequate industrial welfare work are emphasized.

BRUNDAGE, D. K. An Estimate of the Monetary Value to Industry of Plant Medical and Safety Services. Pub. Health Rep. 51, 34:1145 (Aug. 21), 1936.

Primary Pneumonias in Children—Among 1,000 children with pneumonia in a general hospital, bronchopneumonia occurred most frequently in infants and was more fatal than lobar pneumonia. Non-pneumococcus pneumonias were more frequent and fatal in infants than in older children.

BULLOWA, J. G. M., and GREENBAUM, E. The Primary Pneumonias of Infants and Children. Pub. Health Rep. 51, 32:1076 (Aug. 7), 1936.

Comforting Cancer Statistics—In Massachusetts, 1935 was the first year showing a decrease in cancer in both sexes. In some previous years one sex or the other had shown declines, but not both.

CHADWICK, H. D., and LOMBARD, H. L. The Massachusetts Cancer Program. New Eng. J. Med. 215, 7:265 (Aug. 13), 1936.

Laboratory Aids to Smallpox Diagnosis—Complement-fixation tests for suspected smallpox were made successfully upon cases in a recent Canadian outbreak. Details of the test are given.

CRAIGIE, J., and WISHART, F. O. The Complement-Fixation Reaction in Variola. Canad. Pub. Health J. 27, 8:371 (Aug.), 1936.

Rural Communicable Disease Control—Though only a fraction of the communicable disease cases in the area surveyed were reported, most of those that had been were visited. The major effort in control was immunization against smallpox, diphtheria, and typhoid fever.

DEAN, J. O., and PENNELL, E. H. Communicable Diseases and Activities for Their Control in the Brunswick-Greensville Area. Pub. Health Rep. 51, 30:991 (July 24), 1936.

Automobiles vs. Children—Most dangerous to children are the automobiles of the north-eastern part of the

country. The western part is the safest.

GAFAFER, W. M. Mortality from Automobile Accidents among Children in Different Geographic Regions of the United States in 1930. Pub. Health Rep. 51, 32:1076 (Aug. 7), 1936.

Undulant Fever in the Middle West—Iowa and surrounding states have more Brucella infection than other parts of the country, especially of the porcine variety.

HARDY, A. V., *et al.* Undulant Fever. J.A.M.A. 107, 8:559 (Aug. 22), 1936.

Warthin's Cancer Family—Reported here are continued studies of a family which provides strong presumptive evidence for an inheritable organ-specific predisposition to carcinoma.

HAUSER, I. J., and WELLER, C. V. A Further Report on the Cancer Family of Warthin. Am. J. Cancer 27, 3:434 (July), 1936.

Deafened Children's Education—Most hard of hearing children have a low intelligence quotient because of lack of educational experience, not brains. Training in lip reading makes it possible for them to keep up with classmates.

HOFSOMMER, A. J. Lip Reading and the Intelligence Quotient of the Hard of Hearing Child. J.A.M.A. 107, 9:648 (Aug. 29), 1936.

Acquired and Inherited Resistance—One reason why experimental work in animals has not led to more definite results in immunizing man against tuberculosis is that the inheritance of resistance, which the authors believe to be predominantly operative in man, is absent in animals.

MILLER, J. A., and RAPPAPORT, I. Resistance to Tuberculosis. J.A.M.A. 107, 7:472 (Aug. 15), 1936.

When Canada Was Young—This account of the plagues and other hygienic catastrophes that beset Canada in the early days may furnish some future sanitary historian with valuable reference material.

POWER, C. G. Progress of Public Health in Canada. Canad. Pub. Health J. 27, 8:380 (Aug.), 1936.

Thoughts about Eating—Some absorbing speculations on the origin of dietary habits and the influences which affect present-day choice of food. Those who lecture on nutrition might well take a page or two from this stimulating article.

REMINGTON, R. E. The Social Origins of Dietary Habits. Sci. Month. Sept., 1936, p. 193.

Publicity for Nursing — These articles, while devoted to nursing service publicity, have much of value for persons concerned with other branches of public health administration.

RESNICK, D. Publicity for Your Nursing Service.

REDMOND, M. Paper, Pencil, and Publicity.

CORNELL, E. S. The Movie Problem.

GOODRICH, A. M. Making a Movie for a Visiting Nurse Service. Pub. Health Nurs. 28, 8:501 (Aug.), 1936.

ASSOCIATION NEWS

SIXTY-FIFTH ANNUAL MEETING

NEW ORLEANS, LA., OCTOBER 20–23, 1936.

Meeting Headquarters, Municipal Auditorium
Residence Headquarters, Hotel Roosevelt

For the Preliminary Program, Railroad Fares, Hotel Rates, and Post-Convention Tour, see Supplement to the September *Journal*

ALL is in order for the 65th Annual Meeting, New Orleans, La., October 20–23.

The scientific program is complete. The Local Committee has arranged for entertainment and inspection trips. More than forty applications for scientific exhibit space have been accepted. Special trains have been set up from principal cities for travel with pleasant companions. The post-convention tour to Florida and Havana is rapidly organizing. In brief, the various Annual Meeting committees, the City of New Orleans, and the convention management await the large audience which the 65th Annual Meeting will attract.

A 24 page supplement conveying full Annual Meeting information, including program, hotel and railroad rates, train schedules, and a summary of the Florida and Havana tour was bound in the September *Journal.*

NO RAILROAD IDENTIFICATION CERTIFICATES THIS YEAR

It is expected that winter rates to New Orleans will be in effect as usual October 1. Since these are lower than convention fares and are public tariffs, no identification certificates are needed for travel to New Orleans. **Consult your local ticket agent for the best rates prevailing in your territory.**

INSPECTION TRIPS AT NEW ORLEANS

Tuesday, October 20, 2:00 P.M.

Trip to Huey P. Long Bridge, New Orleans Water Purification Plant and New Orleans Sewerage and Drainage System.

Wednesday, October 21, 8:00 A.M.

Trip to U. S. Public Health Service Leprosarium at Carville, La. Two hours of inspection there. Continue to Baton Rouge, luncheon at Louisiana State University Cafeteria, visit to Louisiana State University Campus and State Capitol Building. This trip covers 180 miles and occupies a full day.

Wednesday, October 21, 1:00 P.M.

Visit to Louisiana State University Medical Center, Tulane University Medical School and Charity Hospital, New Orleans, La.

Friday, October 23, 2:00 P.M.

Visit to City and State Health Departments, including Laboratories, Bureaus of Vital Statistics, Sanitary

Engineering, Epidemiology, and Parish Health Administration.

Friday, October 23, 1:00 P.M.

Visit to U. S. Marine Hospital and Quarantine Station.

The Inspection Trips Committee is prepared to arrange special trips for limited numbers to local points of interest upon request.

ENTERTAINMENT AT NEW ORLEANS

The Entertainment Committee, under the chairmanship of Dr. A. L. Fossier, announces that a ball " A Night in Old New Orleans " is planned to follow the opening General Session on Tuesday, October 20. There will be costumes appropriate to the times, Negro mammies to serve the guests, and all the arrangements in traditional New Orleans style. Refreshments will be served.

On Wednesday, October 21, at 3:00 P.M., a trip through the French Quarter with guides is scheduled. This will be followed by tea at the " Court of Two Sisters."

An automobile sight-seeing trip throughout the city takes place on Thursday, October 22, starting at 3:30 P.M.

Dancing will follow the banquet on Thursday evening.

Golf privileges have been secured from various golf clubs.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Ralph H. Allen, M.D., Ruston, La., Director, Lincoln Parish Health Unit

Joseph E. Brodie, M.D., 5 Oakhaven Court, Greenwood, S. C., Greenwood County Health Officer

C. S. Cotlin, Jr., M.D., C.P.H., Box 208, Wetumpka, Ala., Elmore County Health Officer

James T. Duncan, M.D., 351 Beale Ave., Wooster, Ohio, Acting Health Commissioner, Wayne County

Thomas G. Faison, M.D., Winton, N. C., Hertford County Health Officer

Henry C. Gahagan, M.D., Coushatta, La., Director, Red River Parish Health Unit

Marshall E. Groover, Jr., M.D., Box 447, Quitman, Ga., Brooks County Health Officer

Lucius W. Holloman, M.D., Marksville, La., Director, Avoyelles Parish Health Unit

Matt F. Houston, M.D., Houma, La., Director, Terrebonne Parish Health Unit

Fritz A. LaCour, M.D., Crowley, La., Assistant Director, Acadia Parish Health Unit

Raymond F. McAteer, M.D., 4 Narragansett Court, Narragansett, R. I., Director, So. District Health Unit

Bernard T. McGhie, M.D., Toronto, Ont., Canada, Deputy Minister of Health

Peter F. Murphy, M.D., Alexandria, La., Acting Director, Rapides Parish Health Unit

Leland E. Powers, M.D., Port Angeles, Wash., Clallam County Health Officer

A. Einar Rietz, M.D., Vasagatan 6, Stockholm, Sweden, Medical Officer of Health

John Schreiber, M.D., Vidalia, La., Director, Concordia Parish Health Unit

W. K. Sharp, Jr., M.D., U. S. Marine Hospital, New Orleans, La., Regional Consultant, U. S. Public Health Service

Arthur M. Shelamer, M.D., C.P.H., State Dept. of Health, Montgomery, Ala., Field Adviser in County Organization

Hubert S. Smith, M.D., P. O. Box 245, Thibodaux, La., Director, Lafourche Parish Health Unit

Lewis C. Spencer, M.D., Harrisonburg, La., Director, Catahoula Parish Health Unit

Waldo L. Treuting, M.D., Box 311, New Roads, La., Director, Pointe Coupee Parish Health Unit

William E. Van Landingham, M.D., P. O. Box 758, West Palm Beach, Fla., City Health Officer

John M. Whitney, M.D., Jennings, La., Director, Jeff Davis Parish Health Unit

Frank A. Williams, M.D., Franklinton, La., Director, Washington Parish Health Unit

John E. Worden, M.D., 215 N. Carson St., Carson City, Nev., State Health Officer

Laboratory Section

Milward Bayliss, Ph.D. University of Nebraska Medical College, Omaha, Nebr., Instructor, Bacteriology and Public Health
Ruth Castles, State Dept. of Public Health, Nashville, Tenn., Laboratory worker
Herbert W. Emerson, Pasteur Institute, University of Michigan, Ann Arbor Mich., Director
William A. Feirer, M.D., D.Sc., Glenolden, Pa., Director, Mulford Biological Laboratories, Sharp & Dohme
Harley J. Morris, P. O. Box 265, Meadville, Pa., City Bacteriologist
Arthur W. Tallman, P. O. Box 376, Johnstown, O., Director, Hixson Laboratories, Inc.

Vital Statistics Section

Willis C. Beasley, Ph.D., U. S. Public Health Service, Washington, D. C., Assistant Chairman, Health Inventory Operating Council
Margaret Chisholm, 532 Third Ave., Lewiston, Ida., Department Clerk, Nez Perce County Health Dept.
Douglas N. West, 408 Medical Arts Bldg., Atlanta, Ga., Supervisor, Georgia Rural Health Survey Analysis, U. S. Public Health Service

Public Health Engineering Section

Tilden D. Adkins, 605 N. Patterson, Valdosta, Ga., District Engineer, State Dept. of Public Health
Earl B. Barnawell, Box 186, Thomaston, Ga., District Supervisor, Malaria Control and Community Sanitation, U. S. Public Health Service and State Dept. of Public Health
William W. Brush, 24 W. 40 St., New York, N. Y., Editor, *Water Works Engineering*
Arthur H. Herberger, C.E., 200 W. Merrick Rd., Freeport, N. Y., Junior Sanitary Engineer, Bureau of Marine Fisheries
Juan A. Hernandez, C.E., Instituto Finlay, Havana, Cuba, Civil Engineer, National Sanitary Engineering Dept.
Fred R. Ingram, 216 Lyon Bldg., Reno, Nev., *Sanitary Engineer, State Board of Health*
Walter J. Shea, 327 State Office Bldg., Providence, R. I., Chief, Division of Purification of Waters, State Dept. of Public Health

Food and Nutrition Section

Edmund St. J. Baldwin, 110 Hudson St., New York, N. Y., Supervisor, Bureau of Sanitary Control, Borden's Farm Products
Cassius L. Clay, 422 Chartres, New Orleans, La., State Analyst, Bureau of Food and Drugs
Margaret C. Moore, 4833 St. Charles Ave., New Orleans, La., Assistant State Chemist, State Board of Health
James E. Thomson, 110 Hudson St., New York, N. Y., Manager, Production and Quality Control, Borden's Farm Products

Industrial Hygiene Section

James P. Deery, M.D., 58 Bainbridge Ave., Providence, R. I., Chief, Division of Industrial Hygiene, State Dept. of Public Health
W. Eugene Masters, M.D., 750 N. High St., Columbus, O., Medical Supervisor, Bureau of Occupational Diseases, State Dept. of Health
Herbert I. Miller, Jr., 2609 Charlock, Overland, Mo., Industrial Hygiene Engineer, State Board of Health
Carl A. Nau, M.D., State Dept. of Health, Austin, Tex., Director, Division of Industrial Hygiene
Frank A. Patty, 80 Maiden Lane, New York, N. Y., Industrial Hygiene Research Worker, Fidelity and Casualty Company of New York
Beverly L. Vosburgh, M.D., General Electric Co., Schenectady, N. Y.

Child Hygiene Section

Orville Barbour, M.D., 528 Jefferson Bldg., Peoria, Ill., formerly Pediatrician, Peoria Public Health Nursing Assn. Clinic
Lloyd A. Masterson, M.D., 313 New Courts Bldg., New Orleans, La., Director, Division of Maternal and Child Health, State Board of Health
M. Alexander Novey, M.D., 2424 Eutaw Place, Baltimore, Md., Chief, Division of Maternity Hygiene, City Health Dept.

Public Health Nursing Section

Alice A. Campbell, R.N., Court House, Lewiston, Ida., Supervising Nurse, Nez Perce County Health Dept.
Mary M. Cosgrove, R.N., 517 S. 4th Ave., Pocatello, Idaho, Staff Nurse, Bannock County Health Unit
Hazel M. Dobson, Box 502, Pocatello, Idaho, Staff Nurse, Bannock County Health Unit
Margaret E. Fuchs, 912X–9th St., Lewiston, Idaho, Hourly Nursing Service, Nez Perce County Health Dept.
Ruth C. Havenor, c/o County Surveyor, Pocatello, Idaho, Nurse, Bannock County Health Unit
Carolyn M. Hidden, 1 Madison Ave., New York, N. Y., Territorial Supervisor, Metropolitan Life Ins. Co.
Nell K. Hulett, R.N., Grace, Idaho, District Nurse, Dept. of Public Welfare

Audrey E. Jones, R.N., 412 Fourth Ave., Lewiston, Ida., Nurse, Nez Perce County Health Unit

Minerva G. Kloster, Riverside Inn, Lava Hot Springs, Idaho, Staff Nurse, Bannock County Health Unit

Margaret Millay, R-2, Box 374A, Lewiston, Idaho, Staff Nurse, Nez Perce County Health Unit

Helen M. Noble, R.N., Rawls Hotel, Enterprise, Ala., Public Health Nurse, Tuberculosis Survey, Alabama and Tennessee

Lillian O'Callaghan, R.N., Court House, Lewiston, Ida., Staff Nurse, Nez Perce County Health Unit

Laura E. Peck, 900 Blaine, Detroit, Mich., Supervisor, Communicable Disease Nursing Division, Dept. of Health

Phyllis Pehrson, 495 E. 1st N., Logan, Utah, Visiting Nurse, Metropolitan Life Ins. Co.

Elva M. Pugmire, R.N., 1029 N. Hayes, Pocatello, Ida., Staff Nurse, Bannock County Health Unit

Marie C. Quigley, R.N., Hardin County Health Dept., Savannah, Tenn., Public Health Nurse

Marie D. Richardson, R.N., 101 S. Johnson, Pocatello, Idaho, Supervisor of Nurses, Bannock County Health Unit

Marjory Stimson, Simmons College, Boston, Mass., Assistant Professor, Public Health Nursing

Ruth G. Taylor, R.N., 1206 Market St., San Francisco, Calif., Public Health Nursing Consultant, U. S. Children's Bureau

Lucy G. White, R.N., School of Nursing, Vanderbilt University, Nashville, Tenn., Professor of Public Health Nursing

Mary Williams, R.N., Board of Health, Honolulu, T. H., Director, Bureau of Public Health Nursing

Public Health Education Section

Ross L. Allen, Dr.P.H., 133 Fairview Ave., Ann Arbor, Mich., Assistant Editor, *Journal of Health and Physical Education* and *The Research Quarterly*, American Phys. Ed. Assn.

John J. Angel, M.D., M.S.P.H., 2646 Merriman Rd., Wayne, Mich., on staff, St. Mary's Hospital

Margaret A. Conquest, R.N., Lock Box 18, Fenton, Mich., Rural Public Health Worker

Edwin C. Ganzhorn, M.D., 309 S. Main, Ann Arbor, Mich., Washtenaw County Physician

Elma C. Graham, Court House, Beaver, Pa., Executive Secretary, Beaver County Tuberculosis Assn.

Edith L. Grant, R.N., 313 Eagle St., Medina, N. Y., Nurse Teacher, Board of Education

Mary S. Gray, R.N., 521 Roycroft Ave., Iron Mountain, Mich., Trainee for Public Health Nursing

Marcia S. Hays, M.D., Stanford School of Medicine, San Francisco, Calif., Instructor, Dept. of Public Health and Preventive Medicine

George W. Watson, Gratiot, O., Hygiene Teacher, Hopewell High School

Epidemiology Section

William A. Brumfield, Jr., M.D., C.P.H., State Dept. of Health, Albany, N. Y., Medical Consultant, Division of Social Hygiene

Carl N. Neupert, M. D., 516 E. Gorham St., Madison, Wis., Supervisor of Public Health Service, State Board of Health

Jose Rodriguez Pastor, Health Dept., San Juan, P. R., Tuberculosis Specialist

William M. Rush, 404 U. S. Courthouse, Portland, Ore., Regional Director, U. S. Biological Survey

Unaffiliated

Mary C. Baldwin, M.D., 3616 Main St., Riverside, Calif., School Physician

Charles H. Kinsley, P. O. Box 423, Merced, Calif., Merced County Inspector

Maurice Lenarsky, M.D., 380 Riverside Drive, New York, N. Y., Assistant Clinic Physician, Bellevue-Yorkville Health Centre

H. M. C. Luykx, 1007 Seyburn, Detroit, Mich., Chief, Tabulating Dept., U. S. Public Health Service Health Inventory

Harold Rosenblum, M.D., 2200 Post St., San Francisco, Calif., Medical Director, Mt. Zion Hospital

Edward T. Ross, 307 State Bldg., San Francisco, Calif., Chief, Bureau of Sanitary Inspections, State Dept. of Public Health

DECEASED MEMBERS

Edwin W. Bullock, M.D., Somerville, Mass., Elected Member 1921

Marion H. Ewalt, Pittsburgh, Pa., Elected Member 1935

Alfred B. Lippert, M.D., Sidney, O., Elected Member 1927

Baylis F. Sloan, M.D., Walhalla, S. C., Elected Member 1934

John C. Chase, Derry, N. H., Elected Member 1890, Fellow 1922.

George T. Hammond, Brooklyn, N. Y., Elected Member 1920, Fellow 1922

Wade Wright, M.D., Roxbury, Conn., Elected Member 1921

APPLICANTS FOR FELLOWSHIP

(*Additions to lists published in July and August Journals*)

HEALTH OFFICERS SECTION

Judson D. Dowling, M.D., Birmingham, Ala.
Jesse C. Ellington, M.D.. C.P.H., Ancon, C.Z.
Lee A. Stone, M.D., Madera, Calif.
Albert W. Sweet, Ph.D., Freehold, N. J.

INDUSTRIAL HYGIENE SECTION

Zolton T. Wirtschafter, M.D., Cleveland, Ohio

PUBLIC HEALTH EDUCATION SECTION

Lawrence G. Sykes, M.D., New York, N. Y.

EPIDEMIOLOGY SECTION

Carleton Dean, M.D., C.P.H., Charlevoix, Mich.
Morris L. Grover, M.D., M.P.H., Providence, R. I.
George C. Payne, M.D., Dr.P.H., San Juan, P. R.

UNAFFILIATED

Francis E. Colien, Ph.D., Omaha, Nebr.

CORRECTION

In the August *Journal*, on page 812, appeared a filler on "Causes of Insanity," taken from a magazine which comes to the A.P.H.A., and which was thought to be reliable. However, we find now it was not so, and we can get no definite information on such a study having been made by the American Medical Association.

NEWS FROM THE FIELD

ASSOCIATION OF WOMEN IN PUBLIC HEALTH

THE Association of Women in Public Health will hold its customary dinner meeting on Monday evening, October 20, just before the first session of the American Public Health Association. This is an open meeting which all members of the A.P.H.A. and their friends are invited to attend. The A.W.P.H. meeting is always an informal friendly gathering, one of the prime objects of the Association being the strengthening of old acquaintanceship and the forming of new ties of fellowship. The program, necessarily brief, will consist of several 10 minute discussions of the changes which have come about in various fields of public health during the past year, a sort of parade of New Styles in Public Health.

Dinner will be served promptly at 6:30 at $1.50 per plate. Tickets may be obtained at the main Registration Desk.

WILLIAM HALLOCK PARK LABORATORY

ON Tuesday, October 6, the New York City Department of Health will dedicate a new laboratory building for the laboratory unit at the foot of East Sixteenth Street so long directed by Dr. William H. Park. The dedication will be utilized to pay a tribute to the distinguished services rendered by Dr. Park in the promotion of public health. Hereafter the laboratory will be known as the William Hallock Park Laboratory.

With the dedication of the new laboratory Dr. Park will relinquish active direction, this work being intrusted to Dr. Ralph Muckenfuss. Dr. Park entered the service of the Department of Health in April, 1893, and has thus been in continuous service for over 43 years. Speakers at the dedication exercises will include Surgeon-General Parran, Professor C.-E. A. Winslow, Mayor LaGuardia, Commissioner John L. Rice, and others.

ROAD NAMED FOR HENRY ROSE CARTER

CARTER Place, Balboa Heights, C. Z. South of Gorgas Road, and extending from the Cathedral of St. Luke to Frangipani Street, a palm-lined roadway passes in front of the official quarters of the Superintendent of Gorgas Hospital. On this site

formerly stood the quarters occupied by the late Henry Rose Carter, U. S. Public Health Service, Chief Quarantine Officer of the Isthmian Canal Commission and later Director of Hospitals. Here Dr. Carter lived from June, 1904, until September, 1909. By proclamation, dated July 16, 1936, J. L. Schley, Governor of the Canal Zone, designated the roadway as Carter Place, honoring one of the Service's most beloved and distinguished officers.

In his citation, Governor Schley said, "Dr. Carter was recognized as one of the most efficient and valuable of the Department of Sanitation personnel during the construction period; his work contributed largely to the successful organization of the Department of Sanitation and its hospitals and quarantine service and to the early control of infectious diseases so largely prevalent at the time of the inception of the work."—*Health Officer*, Sept., 1936.

HEALTH COMMITTEE APPOINTED FOR NEW YORK WORLD'S FAIR

THE Advisory Committee on Medicine and Public Health, one of the first of the technical committees of the New York World's Fair, has been appointed. This committee includes 3 members of the American Public Health Association Committee on American Museum of Hygiene. It is expected, therefore, that plans for the health exhibit at the Fair will be correlated with those of our committee for a permanent museum of hygiene in America. Members of the committee are:

Louis I. Dublin, Ph.D.,* *Chairman*
James R. Reuling, Jr., M.D., *Vice-Chairman*
Homer N. Calver,* *Secretary*
John L. Rice, M.D.
S. S. Goldwater, M.D.
George Baehr, M.D.
Victor G. Heiser, M.D.*

* Members of American Public Health Association Committee

As Chairman, Dr. Dublin, who sailed September 5 for Europe, was authorized to extend an invitation to international health and medical agencies to meet in New York at the time of the Fair. The Secretary of the committee, Mr. Calver, has just returned from a study in Germany of health museums and expositions. The study was financed by a grant from the Oberlaender Trust.

A tentative plan of the medical and health exhibits has been prepared. Early this fall a meeting of representatives of all local and national agencies concerned will be held to complete organization and exhibit plans.

NURSES NOTE!

CHANGE of date and program for The Nurses' Session at the National Safety Congress and Exposition to be held in coöperation with the National Organization for Public Health Nursing, at Atlantic City, N. J. Time of Meeting—Wednesday, October 7, 1936, at 9:45 A.M. Topic—Panel Discussion—"Industrial Nursing Pays in Relation to Industrial Health and Safety."

TABULATION OF HEALTH DEPARTMENT SERVICES

REQUESTS are not infrequently received by the Association for advice and assistance in the preparation of forms for tabulating services rendered by health departments. Because of great diversity in procedure, it is gratifying to find published a report of the Committee on Records and Reports of the State and Territorial Health Officers and the U. S. Public Health Service, as published in *Public Health Reports* for September 4, 1936, page 1236.

This committee, reporting in April, 1936, presents a suggested list of items to be tabulated by local health officers, together with covering definitions and

instructions. It is believed that this is the first occasion on which official sanction has been given to report forms and definitions of this kind. It should prove helpful not only to state health departments desiring to conform to the usages of the U. S. Public Health Service and the Children's Bureau, but it should be useful alike to any health department wishing to present its material in an orderly fashion and under definitions which will make the tables more comparable with other agencies than previously has been the case.

BRITISH MEDICAL ASSOCIATION

THE 104th annual meeting of the British Medical Association was held in Oxford, England, July 17–25, under the Presidency of Sir James Barrett, of Melbourne, Australia. Prof. Robert J. Johnstone, Queens University, Belfast, Ireland, was named President-Elect, and Sir E. Farquhar Buzzard, of Oxford, was inducted into the presidency.

MICHIGAN HAS NEW LABORATORY

A NEW laboratory building for the State Department of Health is under construction 4 miles north of Lansing. This is a WPA project. All departments of laboratory work will be carried on in the new structure. C. C. Young, D.P.H.,* Lansing, is in charge of the State Department Laboratory.

NEW WISCONSIN HEALTH UNITS

DR. C. A. HARPER, State Health Officer, Madison, Wis., announces that the state has been divided into 9 district health units, together with 3 county units, of which 1 is actually in operation. These units, which cover the entire state, have been created in coöperation with the U. S. Public Health Service.

Prior to the Social Security Act, there were 5 district health units in Wisconsin. At present each district unit consists of a medical director, a sanitary engineer, a certified public health nurse and an office secretary. The county unit consists of a personnel of 4 and the choice is given to the county whether they desire a sanitary engineer or a sanitarian.

The health officers for the 9 districts and the county units are as follows: (1) Dr. G. W. Henika, Madison; (2) Dr. G. E. Hout, Elkhorn; (3) Dr. V. A. Gudex, Fond du Lac; (4) Dr. E. H. Jorris, Mauston; (5) Dr. L. M. Morse, Neillsville; (6) Dr. Allan Filek, Green Bay; (7) Dr. F. P. Daly, Chippewa Falls; (8) Dr. R. L. Frisbie, Rhinelander; (9) Dr. John W. Lowe, Ashland. County Unit—Dr. Harold W. Fechtner, Wausau.

DRS. PARK AND SENIOR RETIRE

DR. WILLIAM H. PARK,* Hermann N. Biggs Professor of Preventive Medicine, and Dr. Harold Dickinson Senior, Professor of Anatomy, at New York University College of Medicine, retired from the faculty September 1 as professors emeritus. Dr. Park has been connected with the college since 1893, and Dr. Senior since 1910.

ARMY MEDICAL LIBRARY ANNIVERSARY

THERE will be a celebration of the One Hundredth Anniversary of the founding of the Army Medical Library, of Washington, on November 16. The ceremonies will take place in the Library Building.

PERSONALS

DR. ALFRED F. SMITH, of Georgetown, Ky., has been appointed Health Officer of Greenup County, succeeding Carl M. Gambill, M.D.†

DR. JOSEPH J. REPA, of Cresson Pa., has joined the staff of the Alabama

* Fellow A.P.H.A.
† Member A.P.H.A.

State Department of Health as full-time Pediatrician.

DR. HENRY P. WORSTELL, of Columbus, Ohio, has been appointed Orthopedic Consultant to the medical division of the State Industrial Commission.

DR. JOHN S. ANDERSON, of New Bern, N. C., has been appointed Health Officer of Craven County.

DR. JOHN C. DECKER, of Portola, Calif., has been appointed Health Officer of Plumas County, succeeding Dr. Wilbur C. Batson, of Greenville.

DR. JAMES F. LYNN recently resigned as President of the Board of Health of Waseca, Minn., to which position he was elected in 1931.

DR. ALBERT C. EDWARDS, of Sheboygan, Wis., has been appointed Epidemiologist for the Wisconsin State Board of Health.

DR. WILLIAM T. BOOHER, JR., of Wellsburg, W. Va., has been appointed Health Officer of Brooke County, to succeed Dr. Leonard J. Bernstein, resigned.

DR. WILLIAM J. FRENCH, formerly of Ellicott City, since 1932 Health Director of Howard County, has been appointed to a similar position with Anne Arundel County, Md., succeeding Dr. John H. Janney, Jr., of Annapolis.

DR. GERALD WENDT has been announced as Director of the American Institute of the City of New York, to succeed L. W. Hutchins, resigned. Dr. Wendt is Editor of *Chemical Reviews*, a consulting chemist, and was formerly Assistant to the President of the Pennsylvania State College. The Institute was founded 108 years ago.

DR. JAMES R. KINGSTON, of Deer River, Minn., has been appointed Director of Public Health for the northern Minnesota district, with headquarters in Grand Rapids.

WILLIAM FELLOWES MORGAN has been reëlected President of the National Society for the Prevention of Blindness, of New York, N. Y.

WALTER A. MINSCH, M.D., of Athens, Ala., has resigned as Health Officer of Limestone County.

WILLIAM J. B. OWINGS, M.D., of Vernon, Ala., has been appointed Health Officer of Escambia County, succeeding Dr. Edward F. Goldsmith, Jr., of Brewton, resigned.

DR. MARY A. T. DEMOTTE, of Philipsburg, has been named Health Officer of Phillips County, Kans.

DR. GRANT R. HASTINGS, of Lakin, has been named Health Officer of Kearny County, Kans.

DR. CARL N. NEUPERT, of Janesville, Wis., has been appointed supervisor of public health service, a new position created under the social security plan for Wisconsin.

DR. LAWRENCE F. ISENHART has been named Health Officer of Mount Carroll, Ill., succeeding Dr. Samuel P. Colehour.

DR. NEIL F. BLACK, of the U. S. Public Health Service, stationed at San Francisco, Calif., has been appointed Health Officer of Klamath County, Ore.

DR. JOHN A. KAHL, of Portland, Ore., has been appointed Health Officer of Clark County, Wash., with headquarters at Vancouver.

DR. ROBERT C. FARRIER,† Morgantown, W. Va., has been appointed Health Officer of Delta County, with headquarters at Escanaba, Mich.

DR. LARS W. SWITZER, Ludington, Mich., has been placed in charge of the new health unit for Mason and Manistee Counties, Mich.

DR. JOHN A. CARTER, New Paris, Ohio, has been appointed Health Commissioner of Clermont County, Ohio.

DR. WILLIAM R. COLEMAN, Bremen, has been made Health Officer of Fairfield County, Ohio.

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* Fellow A.P.H.A.
† Member A.P.H.A.

DR. ARCHIE J. MARTIN, Wheeling, W. Va., has been appointed Health Officer of Belmont County, Ohio, to succeed Dr. Frank R. Dew.*

HEALTH DISTRICT OFFICERS IN SOUTH CAROLINA have been announced as follows: Dr. Clair A. Henderson, Williamstown, appointed Health Officer of the district composed of Dillon and Marion Counties; Dr. Goodman Bare, Starr, in charge of the district including Edgefield, McCormick, and Saluda Counties; and Dr. George H. Zerbst,† Charleston, of the district consisting of Sumter, Clarendon, and Lee Counties.

DR. ROBERT D. HOLLOWELL,† Charlottesville, Va., has been appointed Director of the health district including Albemarle County, Charlottesville, and the University of Virginia. He succeeds Dr. Charles Howe Eller,† recently appointed assistant director of the State Bureau of Rural Health.

DR. HUGH B. MAGILL, JR., Norfolk, Va., has been made director of the Northampton County Health Department, succeeding Dr. Albert B. McCreary,† Eastville, who resigned to join the Florida State Department of Health.

DR. DANIEL C. STEELSMITH, South Boston, has become head of Halifax County Health Department, Va., and Dr. William H. Walcott, Chatham, head of Pittsylvania County Health Department. Formerly these departments were combined.

DR. CHARLES A. O'QUINN, Perry, Fla., has been appointed in charge of the health unit in Taylor County, Fla.

DR. THOMAS T. ROSS, Arkadelphia, Health Officer of Clark County, Ark., has been appointed assistant director of the State Department of Health, in charge of the Division of Maternal and Child Health.

DR. JESSE K. GRACE,† Danville, Ark., has become Health Officer of Clark County, Ark. It is reported that a district health department is proposed consisting of Clark, Nevada, and Hempstead Counties.

FLORIDA appointments as district health officers are reported as follows: Drs. James W. McMurray, with headquarters at Marianna; Rayburn N. Joyner, Jacksonville; and Joseph S. Spoto, Ocala.

DR. THOMAS M. FLY, Hot Springs National Park, Ark., has been appointed Health Officer of Little Rock to succeed Dr. Verdo T. Webb, resigned.

DR. THURMAN B. RICE,† Indianapolis, Ind., has resigned as assistant director of the State Department of Health, and has been succeeded by W. T. Frazier, Bluffton, executive engineer of the department. Dr. Rice will continue to act as director of the health and physical education department. He will also continue as editor of the department's bulletin.

DR. REGNAR M. SORENSEN, Drakesville, Iowa, has been appointed Health Officer of the newly opened health unit in Washington County.

DR. ARTHUR C. SCHACH, Burlington, Iowa, has been appointed director of the reorganized health unit for Des Moines County, with headquarters at Burlington.

DR. CHARLES A. GEORGE has been appointed Commissioner of Health of Springfield, Mo.

DRS. HARRY L. CHANT,† Hornell, N. Y., and EDWIN L. CROSBY, JR.,† Schenectady, have been provisionally appointed assistant district health officers of the State Department of Health, assigned to the Hornell and Albany districts respectively. Dr. Gordon R. Gray, Gouverneur, has

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* Fellow A.P.H.A.
† Member A.P.H.A.

been appointed assistant epidemiologist with headquarters at Amsterdam.

DR. THOMAS G. FAISON, Winton, N. C., has been appointed Health Officer of Hertford County's new department of health.

DR. WILLIAM B. HUNTER, Lillington, N. C., has been named Health Officer of Harnett County, N. C.

DR. RALPH G. BEACHLEY,* Chestertown, Md., has been appointed director of the southwest division of the Virginia State Health Department. He succeeds Dr. Edgar C. Harper,† Richmond, who has been appointed head of the State Bureau for Crippled Children.

DR. JOHN CARLISLE NEALE, JR.,† formerly Health Officer of Henrico County, Va., has been appointed Health Officer of Augusta County, Va.

DR. RALPH E. STEVENS, Health Officer of St. Petersburg, has been named chief physician at the Florida State Hospital, Chattahoochee, succeeding Dr. James H. Pound, resigned.

DR. THOMAS E. MORGAN, Jacksonville, Fla., has been appointed in charge of the newly organized health unit in Pinellas County, with headquarters in Clearwater.

DR. JAMES WILLARD MCMURRAY, Bartow, Fla., has been appointed District Health Officer of West Florida, with headquarters in Marianna.

DR. MARION W. CASKEY,† Taylorville, Ky., has been appointed head of a new health unit at Lewiston, Idaho, one of ten to be established in the state. Dr. Lester C. Krotcher, Coeur d'Alene, has been placed in charge of a unit in Twin Falls, Idaho.

DR. FREDERICK G. NOVY, Dean Emeritus and Professor Emeritus of Bacteriology, University of Michigan School of Medicine, Ann Arbor, received the honorary degree of Doctor of Laws at the 92nd commencement of the University of Michigan. This was the 50th anniversary of Dr. Novy's graduation from the university.

DR. HARRIET BIXBY, Boston, has been appointed state bacteriologist and Dr. August Orr, Sarles, director of the Child Hygiene Division of the North Dakota State Department of Health. Dr. Bixby succeeds A. W. Eckland, Bismarck, resigned. Dr. Orr's appointment marks the reestablishment of the Division of Child Hygiene with Social Security funds, after a lapse of several years.

DR. CYRUS R. WOOD, Port Clinton, Ohio, has been appointed Health Officer of Ottawa County, to succeed the late Dr. Charles B. Finefrock.

DR. HUBERT R. OWENS, Wedowee, Ala., has been appointed Health Officer of Winston County.

DR. FRANK M. HALL, formerly of Leeds, Ala., has been appointed Health Officer of Limestone County.

DR. MARTLE F. PARKER, Boaz, Ala., has been made Health Officer of Monroe County.

DR. ADDIE M. LYON, Frankfort, Ky., has been appointed Health Officer of Lawrence County.

DR. LEE A. DARE, Ashland, Ky., has been appointed Health Officer of Anderson County to succeed the late Dr. Squire R. Boggess,† Lawrenceburg.

DR. WALTER E. MERCER, for 4 years Health Officer of Webberville, Mich., has been placed in charge of the Bureau of Child Health of the Lansing Department of Health.

DR. CECIL C. SMITH, of Indianola, Miss., formerly Director of the Sunflower County Health Department, has been placed in charge of the Pearl River County Health Department, Poplarville.

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* Fellow A.P.H.A.
† Member A.P.H.A.

DR. HAROLD M. KELSO,† Gallatin, formerly Health Officer of Sumner County, Tenn., is in charge of a new district health unit including the Counties of Fentress, Pickett, Clay, Putnam, and Jackson.

DR. PHILLIP MCGINNES has been appointed Health Officer of Joliet township, Ill., to succeed Dr. Londus Brannon who resigned.

GEORGE F. FORSTER, PH.D.,† Professor of Biology at Olivet College, Olivet, Mich., has been appointed bacteriologist to the State Department of Health. He will be on leave of absence from the college for a year.

COL. HENRY C. PILSBURY,† Medical Corps, U. S. Army, has become Chief Health Officer of the Panama Zone. He will be in charge of sanitation and hospital service, stationed at Balboa.

DR. JOHN W. WILLIAMS, JR.,† Springfield, Mo., Health Officer of Greene County for the past 11 years, has been appointed director of rural health with the State Board of Health under the Social Security Program. Dr. Lynn M. Garner,† Health Officer of Miller County, has succeeded Dr. Williams in Greene County.

DR. CLARENCE E. SHERWOOD, Madison, S. D., has been appointed Health Officer of Lake County, to succeed the late Dr. Emerson W. Goldman.

DR. JOHN W. LOWE,† Merrillan, Wis., has been appointed Health Supervisor of the district including Ashland, Bayfield, Burnett, Douglass, Iron, Sawyer, and Washburn Counties, with headquarters at Ashland.

DR. VAUGHN L. HARTMAN, Medina, Ohio, has been appointed Commissioner of Health of Medina County.

* Fellow A.P.H.A.
† Member A.P.H.A.

C. H. BENNING, M.D., C.P.H.,* recently Deputy Commissioner of Health of Oakland County and Director of Health of the Royal Oak District, Mich., since 1927, has become Director of School Health in Peoria, Ill.

MARGUERITE WALES, R.N.,* has resigned as General Director of the Henry Street Visiting Nurse Service, New York, N. Y., and will join the staff of the W. K. Kellogg Foundation of Battle Creek, Mich., to undertake a study of rural nursing problems in relation to the Foundation's program for the advancement of child health and welfare. Elizabeth J. Mackenzie, formerly Associate Director, will serve as Acting General Director in Miss Wales's place.

DR. WADE WRIGHT

DR. WADE WRIGHT, member A.P.H.A., of Roxbury, Conn., died August 25, after a long illness.

He was with the American Expeditionary Forces overseas and was Deputy Commissioner in charge of the medical relief commission sent by the American Red Cross to the Polish front in the typhus zone.

He became instructor in Industrial Medicine at the Harvard Medical School and was for several years in charge of the Industrial Clinic operated by Harvard as a department for clinical research in occupational disease problems at the Massachusetts General Hospital, Boston.

In 1924, Dr. Wright was appointed Assistant Medical Director of the Metropolitan Life Insurance Company to organize its Industrial Health Service for group policyholders. He retired from the Metropolitan in 1930 because of ill health.

Dr. Wright was Chairman of the Industrial Hygiene Section of the American Public Health Association 1921–1922.

DEATHS

THE death of PROF. JULIUS TANDLER in Moscow, Russia, was announced August 26. Professor Tandler had frequently lectured in the United States and was head of the Russian Health Institute as well as former head of the Vienna University Faculty and Austrian Federal Minister of Health. Dr. Tandler was Commissioner of Health, Hospitals and Public Welfare in Vienna for more than 10 years. During his administration he divided the city into 200 districts, each with a practising nurse, and he was active in the establishment of kindergartens in which care was given to the children of poor parents. Dr. Tandler was also active in the establishment of marriage advice bureaus in Vienna. At one time he was Professor of Anatomy at the University of Vienna and had wide interests in the matter of public hospitals and asylums and in the problem of alcoholism.

FRANKWOOD E. WILLIAMS, M.D., formerly Medical Director of the National Committee of Mental Hygiene, and subsequently in private practice in New York City, died September 24.

DR. FRANK G. ATWOOD,† New Haven, Conn., bacteriologist and veterinarian, died on September 14.

† Member A.P.H.A.

CONFERENCES AND DATES

Sixty-fifth Annual Meeting of the American Public Health Association, New Orleans, La. Meetings Headquarters, Municipal Auditorium; Residence Headquarters, Hotel Roosevelt. Oct. 20–23 (Tues., Wed., Thurs., Fri.).

Associations meeting with the A.P.H.A. —New Orleans, La., Oct. 20–23:
- American Association of School Physicians.
- American Association of State Registration Executives.
- Association of Women in Public Health.
- Conference of State Laboratory Directors (Oct. 19).
- International Society of Medical Officers of Health.
- National Committee of Health Council Executives.
- State Conference of Sanitary Engineers (Oct. 19–21).
- State Registration Executives.

American Association of School Physicians. Hotel Roosevelt, New Orleans, La. Oct. 20–23.

American Association of State Registration Executives. Hotel Roosevelt, New Orleans, La. Oct. 20–23.

American Water Works Association:
- Missouri Valley Section. Iowa City, Ia. Oct. 26–28.
- New Jersey Section—Joint Convention with the New Jersey Association of Water Superintendents. Hotel Ambassador, Atlantic City, N. J. Oct. 23–24.
- New York Section. Saratoga Springs, N. Y. Oct. 15, 16.
- Southwest Section. Hotel Goldman, Fort Smith, Ark. Oct. 12–15.

Army Medical Library. Celebration of the One Hundredth Anniversary of the Founding. Library Building, Washington, D. C. Nov. 16.

Association of Military Surgeons. Detroit, Mich. Oct. 29–31.

Association of Women in Public Health. Hotel Roosevelt, New Orleans, La. Oct. 20–23.

Canadian Dental Association. Montreal, Que. Oct. 12–13.

Civil Service Assembly of the United States and Canada. Cincinnati, Ohio. Oct. 21–24.

(*Conferences continued on page 1070*)

Conference of State Laboratory Directors. Hotel Roosevelt, New Orleans, La. Oct. 19.

Conference of State Sanitary Engineers. New Orleans, La. Oct. 19–21.

Dairy Industries Exposition. Atlantic City, N. J. Oct. 12–17.

Dairy Show, Centennial Exposition. Atlantic City, N. J. Oct. 17–25.

Fire Prevention Week. Oct. 6–12.

International City Managers' Association. Richmond, Va. Oct. 19–21.

International Society of Medical Officers of Health. Hotel Roosevelt, New Orleans, La. Oct. 20–23.

Interstate Commission on the Delaware River Basin—Public Meeting, on Water Supply, Flood Control, and Pollution. Buckwood Inn, Shawnee-on-the-Delaware, Pa. Oct. 2–3.

Malaria, Third International Congress on. Madrid, Spain. Oct. 12–18. *Adjourned because of unrest in Spain.*

Missouri Public Health Association. Columbia, Mo. Oct. 1–3.

National Association of Exterminators and Fumigators. Cleveland, Ohio. Oct. 26–28.

National Committee of Health Council Executives. Hotel Roosevelt, New Orleans, La. Oct. 20–23.

National Dairy Show, National Dairy Association. Dallas, Tex. Oct. 10–18.

National Rehabilitation Association. San Antonio, Tex. Oct. 26–30.

National Safety Council—Annual Safety Congress and Exposition. Atlantic City, N. J. Oct. 5–9.

New Jersey Association of Water Superintendents — Joint Convention with the New Jersey Section, American Water Works Association. Hotel Ambassador, Atlantic City, N. J. Oct. 23–24.

New Jersey Health and Sanitary Association, Inc.—Sixty-second Annual Meeting. Hotel Woodrow Wilson, New Brunswick, N. J. Nov. 20–21.

New York State Association of Public Health Laboratories. New York State Laboratory. Albany, N. Y., Nov. 6.

New York State Sewage Works Association. Geneva, N. Y. Oct. 9–10.

Ontario Hospital Association. Toronto, Ont. Oct. 21–23.

Pennsylvania Water Works Association. Haddon Hall, Atlantic City, N. J. Oct. 14–16.

Public Ownership League of America. Abraham Lincoln Hotel. Springfield, Ill. Oct. 15–17.

Southern Tuberculosis Conference. Hot Springs, Ark. Oct. 1–3.

State Conference of Sanitary Engineers. Hotel Roosevelt, New Orleans, La. Oct. 19–21.

State Laboratory Directors, Conference of. Hotel Roosevelt, New Orleans, La. Oct. 20–23.

Texas Public Health Association. Kilgore Hotel, Kilgore, Tex. Oct. 14–16.

Third International Congress on Malaria. Madrid, Spain. Oct. 12–18. *Adjourned because of unrest in Spain.*

Water Supply, Flood Control, and Pollution—Public Meeting of the Interstate Commission on the Delaware River Basin. Buckwood Inn, Shawnee-on-the-Delaware, Pa. Oct. 2, 3.

West Virginia Public Health Association. Wheeling, W. Va. Oct. 12–14.

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(Continued)

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In addition to the exhibits mentioned above, which represent products, equipment and services of value in health protection and promotion, an extensive exposition of the work of the Association members will be shown.

Positions Wanted

HEALTH OFFICERS

Physician, M.D. Medical College of Virginia; 3 years' in the Medical Corps, U. S. Navy; city health officer for 16 years; desires position as health officer. Eastern city preferred. A-274

Physician, M.D. Hahnemann Medical College; special course in public health at University of North Carolina; wishes position as county health officer in the Northeastern area. Served as school physician of a small township for 7 years. Available at once. A-275

Physician, M.D. University of Wisconsin; M.P.H. Harvard School of Public Health; special courses in industrial hygiene; available now for an administrative position or one in industrial hygiene. A-279

Physician, M.D. New York Medical College and Flower Hospital; extension course for public health officer, New York State Department of Health; 3 years' urologic service in various New York City hospitals; desires position as health officer or in social hygiene department. A-266

Physician, M.D. University of Nebraska; 13 years' experience as city or county health officer in different sections of the West; desires position as health officer. Prefers West Coast. A-267

Physician, M.D. Indiana University; C.P.H. Johns Hopkins University; special courses in epidemiology, bio-statistics and public health administration; several years' experience as physician to city health department; desires position as full-time county health officer. A-269

Physician, M.D. Western Reserve University; 3 months' Health Officers' course at Johns Hopkins; 1 year's experience as instructor of Hygiene and Bacteriology; 4 months as county health officer; desires position as health officer or in the field of research. A-273

LABORATORY

Young man, M.S. in Bacteriology, University of Colorado, desires position in a health department laboratory or in the teaching field. Experience covers laboratory work in a state health department, graduate assistant in the department of bacteriology and public health of a university school of medicine, and bacteriologist and chemist of a city health department. West preferred. L-276

Young woman, B.S. University of Chicago, desires position in the field of bacteriology or parasitology. Has been employed as first assistant and research fellow in the department of bacteriology, parasitology and serology of a Chicago hospital, head of a private clinical laboratory, supervisor of a unit for survey of food handlers for carriers of E. Histolytica under Chicago Board of Health, bacteriologist in a health department and in a tuberculosis sanitarium. L-277

Laboratory man available. Trained at New York Post-Graduate and at St. Luke's, New York, in bacteriology, serology, hematology, blood chemistry and urinalysis; 13 years' experience in all routine procedures except tissue. L-278

Young woman, B.S. Tufts College; M.S. University of Illinois; Ph.D. Western Reserve University; 4 years' experience as director of a city health department laboratory and several years' experience in both commercial and hospital laboratories; desires position doing research or routine in chemistry, biochemistry, bacteriology or serology in public health laboratory. L-272

Technician, young man, graduate Brooklyn College; extensive experience in laboratory medicine, blood chemistry, bacteriology; several publications in serology; former research worker in Grade A medical school; special work in Darkfields; desires position as medical technician or research worker. L-218

MISCELLANEOUS

Physician, graduate of Washington University Medical School, desires position with state department of public health to do educational writing on mental hygiene, child guidance or venereal diseases. Capable of group instruction in health education. M-197

Young woman, Ph.D. Columbia University; considerable experience in the field of health education with official, voluntary and commercial organizations; is interested in a position as Director of Public Health Education in a city, state or agency. M-255

Where no other address is given excepting the key number, address your replies to the American Journal of Public Health, 50 West 50th Street, New York City, indicating clearly the key number on the envelope. Your replies will then be forwarded.

Directory of Health Service

VITAMINS IN CANNED FOODS

IV. VITAMIN B_1

The story of vitamin B_1 is quite long and involved. Properly, it has been fully covered at some length in authoritative dissertations on the vitamins (1).

The original vitamin B of Eijkman and of Funk, while definitely possessed of antineuritic potency, is now known to be of a complex nature. Between 1919 and 1926, the vitamin B complex was resolved into vitamins B (B_1) and G (B_2). Subsequent work has indicated the existence of other vitamins in the complex, whose chemical natures or relations to human nutrition are not as yet clearly understood.

As a direct result of many researches on vitamin concentrates, the chemical identity of the crystalline antineuritic factor has recently been described as a derivative of 6-aminopyrimidine (2).

It has been known for many years that vitamin B_1 may be destroyed by heat. In the canning procedure, a number of heat treatments of food may be involved, especially in the thermal "processing" of the product to insure its preservation. In the "process", many foods are subjected to a heat treatment after sealing in the can, to destroy spoilage organisms which may be present on the raw material. In other cases, the food is filled into the cans at a sufficiently high temperature to obtain the same result. Therefore, the question of the effect of the canning procedures on vitamin B_1 frequently arises.

The times and temperatures necessary for the processing of canned foods are governed by a number of factors, important among them being the pH of the food itself. Highly acid foods require only short heat processes at the temperature of hot or boiling water to destroy spoilage organisms. The so-called "non-acid" or "semi-acid" products require higher temperatures —usually 240°F. (116°C.).

As might be expected, acid foods have been found to suffer only a slight loss of vitamin B during canning (3).

The degree of retention of vitamin B_1 in the non-acid foods is not as high as in the acid foods. (4).

This is partly due to the heat treatments accorded them and possibly also to their low acidity, since the vitamin is more stable in acid media.

The facts in the case may be summarized briefly by the statement that commercially canned foods may be depended upon to supply vitamin B to extents consistent with the amounts of the vitamin originally present in the raw materials from which they were prepared. Because of their widespread use, canned foods contribute a notable amount of vitamin B_1 to the American dietary.

AMERICAN CAN COMPANY

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(1) Vitamins: A Survey of Present Knowledge Medical Research Council, Special Report Series, No. 167, 1932. His Majesty's Stationery Office, London

The Vitamins H. C. Sherman and S. L. Smith 1931 Am. Chem. Soc. Monograph, 2nd Edition

(2) 1935. J. Amer. Chem. Soc. 57, 1751

(3) 1932. Ind. Eng. Chem. 24, 457

(4) 1932. J. Nutrition 5, 307

This is the seventeenth in a series of monthly articles, which will summarize, for your convenience, the conclusions about canned foods which authorities in nutritional research have reached. We want to make this series valuable to you, and so we ask your help. Will you tell us on a post card addressed to the American Can Company, New York, N. Y., what phases of canned foods knowledge are of greatest interest to you? Your suggestions will determine the subject matter of future articles.

The Seal of Acceptance denotes that the statements in this advertisement are acceptable to the Council on Foods of the American Medical Association.

American Journal of

Public Health

And The Nation's Health

Volume 26 — November, 1936 — Number 11

Published by the

American Public Health Association

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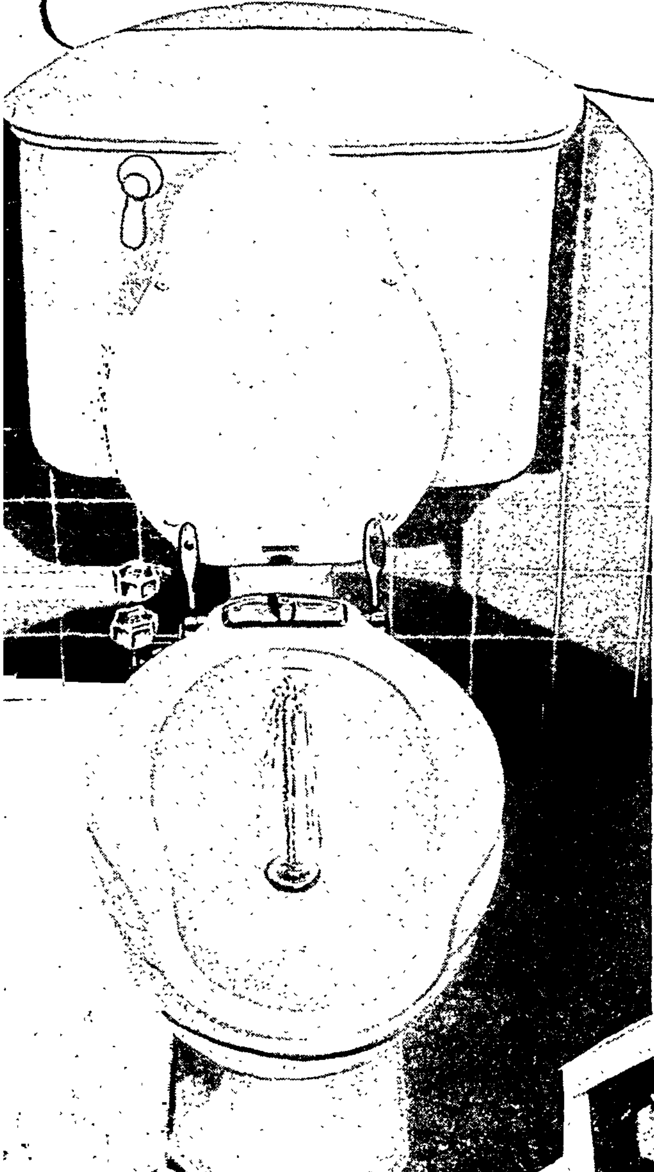

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BY BETTY LOU WILLIAMSON, R.N.

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They *think better and bigger thoughts;* they work better and they accomplish greater results. They become open-minded and receptive to higher standards of living and they make greater progress.

The Nu-Bidet is a definite and forward step in that direc*tion. Its use is a liberal education in personal cleanliness,* self-respect and higher ideals.

If you but realize it, the Nu-Bidet is as necessary to personal hygiene and general cleanliness, in every home, hospital and public institution, as a bathroom or a tooth brush.

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Sitz Bath for personal hygiene and treatment of rectal disorders. Spray for same purpose and feminine hygiene. Attachment for douche, enema and hydrotherapeutics, entirely eliminating the old rubber bag method.

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American Journal of Public Health

and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 26 November, 1936 Number 11

CONTENTS

Continued on page vi

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Readers' Guide in your library.

Published by the American Public Health Association, 374 Broadway, Albany, N. Y.

Executive Office, 50 West 50th Street, New York, N. Y.

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Address correspondence regarding editorial contents and manuscripts to the Editor in Chief, Mazÿck P. Ravenel, M.D., University of Missouri, Columbia, Mo.

Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 50 West 50th Street, New York, N. Y.

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BELL TELEPHONE SYSTEM

Continued on page viii

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IT IS our privilege to present, as our contribution to public health education in America, the Camp Transparent Woman—an exact life-size reproduction of the female body, with every organ, blood-vessel and bone clearly visible. Before going on a transcontinental tour, this figure is being shown to the general public at the New York Museum of Science and Industry, where leading medical and health authorities attended its recent premiere.

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Society	*Secretary*	*Place and Time of Annual Meeting*
Connecticut Public Health Assn.	Ira V. Hiscock	May, 1937
Florida Public Health Association	S. G. Thompson, D.P.H.	Tampa, Dec. 7–9, 1936
Georgia Public Health Association	M. E. Winchester, M.D.	To be announced
Massachusetts Public Health Assn.	G. Donald Buckner, S.B.	Boston, Jan. 28, 1937
Michigan Public Health Association	Marjorie Delavan	Lansing, Nov. 11–13, 1936
Missouri Public Health Association	Dr. C. F. Adams	To be announced
New Mexico Public Health Assn.	Paul S. Fox	To be announced
Northern California Public Health Association	Dr. I. O. Church	To be announced
Ohio Federation of Public Health Officials	W. D. Bishop, M.D.	Columbus, Nov., 1936
Pennsylvania Public Health Assn.	J. M. J. Raunick, M.D.	To be announced
South Carolina Public Health Assn.	Laura Blackburn	To be announced
Southern California Public Health Association	Charles W. Arthur	To be announced
Texas Public Health Association	Lewis Bracy	To be announced
Virginia Public Health Association	B. B. Bagby, M.D., Pres.	To be announced
West Virginia Public Health Assn.	John Thames, M.D.	To be announced
Southern Branch, American Public Health Association	G. Foard McGinnes, M.D.	Baltimore, Md., November 17, 18, 1936
Western Branch, American Public Health Association (joint meeting with Arizona Public Health Association)	William P. Shepard, M.D.	Phoenix, Ariz., April, 1937

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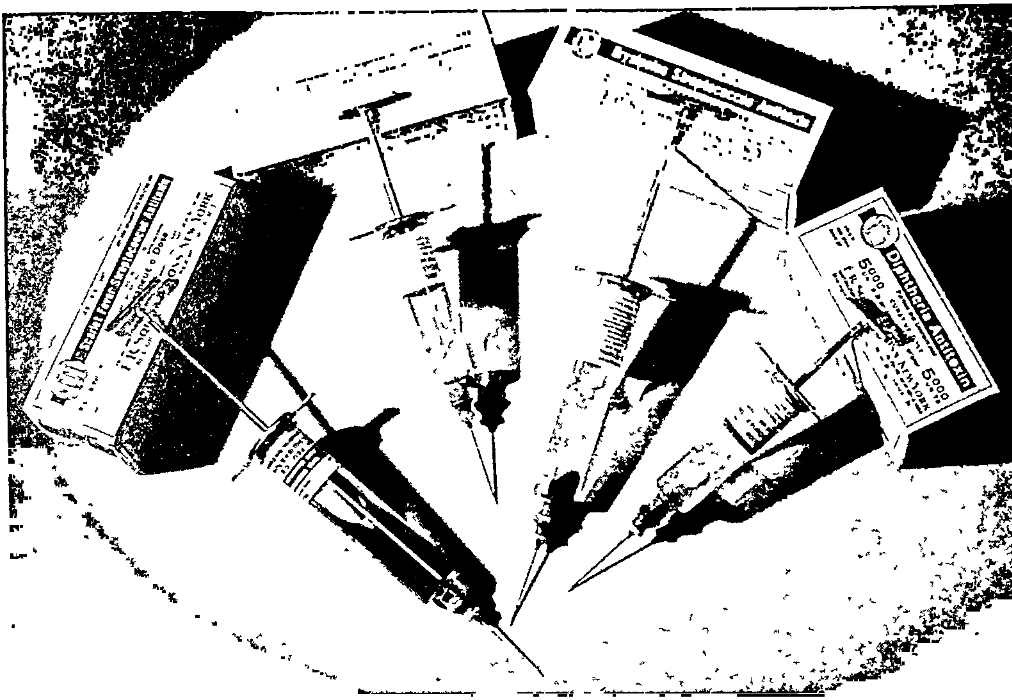

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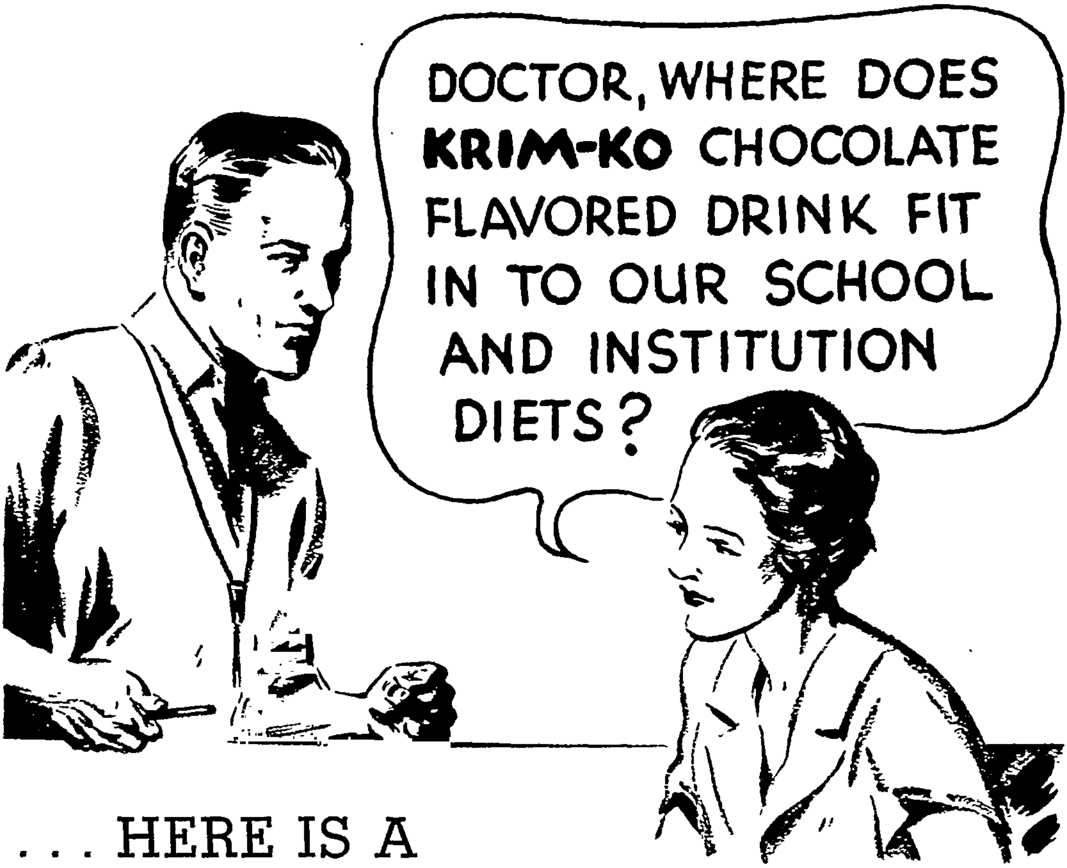

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Reporting Progress*

THOMAS PARRAN, M.D., F.A.P.H.A. (*Life Member*)

President of the American Public Health Association; and Surgeon General, U. S. Public Health Service, Washington, D. C.

IT is a signal honor for any member of our profession to be elected to the presidency of this Association. I am deeply grateful for the esteem and confidence of my colleagues who have given me this high office of privilege and opportunity.

We are met in this 65th Annual Convention as an organization invested with new life, a new interest in the contemporary scene, and a new zest for the tasks before us. Because social concepts are changing, and among them the concept of public health, the wisdom we show in dealing with those tasks will determine largely the future of public health in our time. And what wisdom we have had, for the most part has stemmed directly from our professional collaboration in this, the only professional organization in which there is a place for all public health workers.

Our common interests grow with the expansion of our work, and the needs of the Association keep pace with them. Just as laboratory equipment needs to be kept up to date, so the Association from time to time will need to adjust and readjust details in plan and program to promote the continuing purpose of the Association, which is the attainment for public health of its rightful place in the life of the nation. This purpose is so fundamentally important that its achievement should command the personal service, the active interest, and the zealous loyalty of each member of our profession. Our membership should be doubled, yes even tripled; regional and state societies, now tottering infants, should become powerful branches. For unless the practitioners of public health can make common cause, they will not be able to ask coöperation for their cause from the American people. Drawing its members from many basic sciences, this organization should develop in them the guild spirit. Out of conference, discussion, and study should flow clear statements of policy, objectives, and methods. Public health needs should be interpreted to the people. Appropriate public action to meet those needs should be suggested and encouraged by this Association. Ours is a dynamic profession. In it and because of it great events are transpiring. We have it in our power,

* Presidential Address delivered before the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 20, 1936.

through the efficient functioning of this Association, to make permanent contributions to the promotion of physical and mental health for all the people.

What is the place of public health in modern life? Formerly it was concerned only with the mass problems of sanitation. The practical disappearance of many diseases directly caused by an unhealthful environment is one of the brightest chapters in the story of man's progress. But even though such diseases as smallpox or typhoid no longer overwhelm us, we dare not relax our effort. We must hold the lines, consolidate our gains, and push on to the gaining of new ground against the diseases and conditions which continue, needlessly, to waste the lives of our people. Public health in the light of present scientific knowledge goes far beyond environmental sanitation. It necessarily must be concerned with all factors which make for healthful living—the prevention, alleviation, and cure of disease by all methods known to science; the promotion of the physical and mental status of the race; the provision of decent housing, healthful working conditions, facilities for recreation, food adequate in amount and kind for proper nutrition; a standard of living compatible with normal family life and the upbringing of children. It is the *specific* responsibility of public health to provide, through community effort, those services for the saving of life and prevention of disease which the individual is unable to provide, or to provide as well, by his individual efforts.

In addition to those generally accepted health measures which are provided directly by a health department, community effort concerned directly and indirectly with public health may be considered broadly in two groups:

1. Those measures of direct concern to a health department but not necessarily provided by it, such as bedside nursing, medical, dental, and hospital services for the population groups in need of them.

2. General health measures, such as better housing and recreation facilities, which have a direct influence upon health but in this country have been unrelated to health agencies.

There is much difference of opinion as to how far a health department itself should administer activities in the first group.

If control of a disease is possible only when adequate treatment is provided for that disease, it is generally agreed that the health department has a direct responsibility to see that such treatment is given to those unable to provide it for themselves, whether for tuberculosis, for syphilis, or for pneumonia. Such service must be provided and coördinated with other public efforts for the prevention and cure of disease.

In principle, I hold the view that all community services for the prevention of disease and care of the sick should be the responsibility of the health department, in so far as such measures are paid for from public funds. The extent to which these services are actually administered by the health department, however, is a matter which can best be decided by the individual state or locality.

In addition, health departments should be particularly interested in the control of any disease which is a burden to the community, whether or not communicable, because of its wide prevalence or the excessive cost of treatment to the individual. The coordinated campaign against pneumonia launched last year by the organized medical profession of New York State and the State Department of Health is a case in point. Another example is the cancer campaign in Massachusetts. Mass attack upon these and similar diseases is relatively new, however, in a majority of the states. We have been looking at them through a micro-

scope for so long that it is difficult to refocus for a telescopic view. Yet both views are necessary if we are to see them in their entirety, and both the individual and the mass attacks are necessary, if we are to gain ground against our modern plagues.

In the tremendous problem of providing medical care for the indigent, the social welfare agencies have taken the lead, largely because health departments have been unwilling or unable to accept this as a direct responsibility. The situation, however, is somewhat analogous to the relation of the health officer to the public water supply. He must know the needs for an adequate supply of potable water. He champions the provision of such a supply. He sees to it that the water plant is properly operated, even though this may be done by another branch of the city government. This is the minimum responsibility which the health department should assume, both for the public water supply and for the public medical service needed by those unable otherwise to provide it. In fact, the health department should be instigator of and friend to all useful activities for the conservation of life and health. For if health officers do not recognize their responsibility, using all methods given us by science, to organize community attacks upon causes of ill health, the public health profession will revert to the ancient status of sanitary police, and other public medical agencies will be established to deal with the major health problems of today and tomorrow. We may be sure such problems will be dealt with.

Chief among the problems of today is that of establishing upon sound bases the health provisions of the Social Security Act. Last year in Milwaukee we heard several discussions of the promise to health work inherent in this Act. This year we can report that this promise is being realized in terms of more and better health service to the people. Though relatively small in total expenditure as compared to that for other aspects of security, the $13,200,000 allotted this year from the Public Health Service and the Children's Bureau, as compared with the previous meager and sporadic federal appropriations, represents a great advance and has helped to provide more tools for life saving. It has lessened by a little the gap between our knowledge and our performance of how to promote health. It has given us, at last, the beginnings of a national health program. Though we are spending for this purpose about 10.7 cents per capita, or about 10 per cent of previous public health expenditures, nevertheless these funds have made it possible to employ 2,536 full-time persons and 496 part-time personnel, among whom are 579 physicians, 1,081 nurses, 65 dentists, 144 engineers, 296 sanitary inspectors, and 174 laboratory technicians, as well as badly needed clerical assistance.

The administrative organization has been strengthened in all states but 5; $500,000 being spent for this purpose. Local health service is being aided in all states but 2; $3,500,000 being spent for this purpose.

The technical services of the states are using another $1,300,000. Approximately $1,000,000 is being used for the training of 1,243 personnel. Another $1,200,000 is accounted for by special health activities such as work in industrial hygiene, malaria in the southern states, plague on the Pacific Coast, and syphilis wherever the state health authorities have the interest and the energy to pursue it.

In order to match federal health funds, new state and local appropriations approximate $3,000,000.

Further impetus to public health has been given through the use of federal emergency funds which financed the

national health inventory started in 1935 by the Public Health Service and almost completed. This should make available information concerning many aspects of national health heretofore unknown, including the incidence and duration of serious disabling illness among 3½ million persons over a 12 month period; the medical and nursing service which they received; the prevalence of chronic diseases, of orthopedic defects and blindness; the incidence of specific communicable diseases and the completeness of reporting; and the extent and utilization of medical and public health facilities in the different types of communities.

Employment through federal emergency funds has been provided also for approximately 6,000 nurses, themselves destitute, who have been added to the staffs of state and local health departments for community nursing. In some states, this has represented a 50 per cent increase in the total public health nursing personnel. Fifty thousand hospital beds similarly have been provided with the assistance of federal funds.

Community sanitation has been improved in 41 states; approximately 1,000,000 sanitary privies have been constructed. Extensive drainage projects in 16 southern states have provided more than 10,000,000 feet of ditches draining 87,000 acres and protecting 2,290,000 people against malaria. There are under way or completed 4,080 projects for the extension and improvement of public water supplies and sewage disposal plants at a cost to the federal government of $426,572,411. In fact, sewage treatment facilities have been increased by more than 30 per cent during the past 4 years. Pollution of streams has been further reduced by the sealing of nearly 4,000 abandoned coal mines.

In addition to grants-in-aid to states and the use of emergency funds for purposes of health and sanitation, appropriations of the Public Health Service for research into problems of disease and sanitation have been increased by more than $1,000,000. The record will show that the composite of these activities is contributing substantially to the health of the nation. We have made a good start. How far we go depends upon our ability as health workers to get together and to work together, and upon the capacity of the public health profession to interpret such work to the citizen and taxpayer.

This last possibility begins to look somewhat more promising. In the past we have thought somewhat wistfully that public health might be sold to the public if we could train health officers to be orators and advertising writers. That method is as impractical now as it ever was. Yet so far as gaining our objectives is concerned, we are fortunate in that sales resistance is decreasing. It is becoming obvious that the taxpayer can save money through the prevention of disease. He is begining to ask: "Why should we pay pensions for the blind and do so little to prevent blindness? Why should we add to the burden of those made destitute in their old age by chronic preventable sickness? Why should we pay widows' pensions when we could prevent the death of the breadwinner?" There has been added, therefore, to the humanitarian appeal of public health—and humanitarianism is one of the last of the acquired human characteristics—the direct economic advantage of public health work which can be made obvious to the most penny-pinching taxpayer.

The point is that in public health we have a task which, within scientific boundaries, we know how to do. No matter what their school or party, economists have not yet demonstrated that they know how to prevent cycles of unemployment; therefore, insurance

is provided in most civilized nations to soften the impact of a job loss. Until science shows us how to prevent unemployment, we must care for the unemployed. The cost of this, by whatever method, is a necessary tax. Not so the tax for carrying the burden of the needlessly unfit. The mother who dies in childbirth, needlessly; the father who contracts tuberculosis in industry; the young people who are infected with syphilis; the children who grow up deformed by rickets—each contributes to the breaking up of a family, to social and economic loss. All are examples of the *preventive* possibilities of public health provisions under the Social Security Act as contrasted to the *palliative* nature of job insurance and pensions for the unemployable.

We may have confidence not only in objectives of today's national health program, but also in its method. The federal-states relationship in public health functions smoothly because we merely are extending a well established procedure. In 1880 the Congress authorized the Public Health Service to coöperate with states in the prevention and control of epidemic diseases. The mechanism of such coöperation has been worked out during these past 56 years. We can cite this half century of federal-states relationships in public health in support of the soundness of the principle, in the flexibility of action which is permitted, and in the avoidance of over-centralization.

Thus far, I have discussed public action in the health field. A distinctive feature of public health work in this country has been the active participation of voluntary organizations and foundations. The question frequently brought up now is the extent to which the work of such non-governmental agencies will be replaced by the present larger public expenditures.

It is hoped that it never will be necessary to replace the health work of the voluntary organization. Current public expenditures fall far short of present needs. The acceptance by the public of responsibility for work originally started as a voluntary experiment frees voluntary funds for other pioneering effort. The frontier of public health constantly is expanding as science gives us new tools with which to attack new disease problems. The frontier represented by the periphery of a circle obviously grows larger as the circle expands. Moreover, the application of knowledge brings increasingly the need for practical information concerning most effective methods. To develop these methods, to work out new technics, to promote further research, to make experimental application of laboratory facts, to prepare the public mind for acceptance of new health activities, to inform the public of the values and results of public health programs, is the continuing opportunity and obligation of the voluntary and philanthropic health agency.

I have referred to the need for wisdom in doing our tasks. The current extension of public health work makes it extremely important that we should consider critically the work we are doing, appraise the effectiveness of procedures, discard the less useful, and take up with more vigor those tasks which promise a larger return for money and effort. Such studies of administrative practice as have been carried out by this Association, and also studies of public health methods which have been conducted by the Public Health Service are providing tentative means for such appraisal.

Sometimes it has been said that we have been too much concerned with the internal organization of health service and too little concerned with the actual service rendered to the people. The public is interested in what it gets from its health department, not in its form of organiza-

tion. Perhaps we have gone too far also in insistence upon a "balanced program" which, upon analysis, may mean mediocre performance in many fields in accordance with predetermined standards which have little or no scientific basis, rather than a determined and adequate frontal attack on the few major preventable conditions.

An evil to be guarded against in the federal-states relationships and in the work of this Association is too early and too great an insistence upon standardization. The problems of this country are so diverse that we should not make a uniform approach to such a multiform situation. Suppose the automobile manufacturers had standardized on the 1920 models! I fear that some health departments standardized before they modernized.

I agree with those who feel that we should direct our attention to particular diseases and conditions, using the health organization as a means to an end rather than an end in itself. On other occasions I have discussed the reasons why the control of syphilis, tuberculosis, cancer, pneumonia, infant mortality, and improved nutrition should be major objectives. Mental hygiene has a real contribution to make to clear thinking and emotional stability. In certain places it may be malaria or some other geographically limited disease. In every case, however, we should attack with most vigor where the greatest saving of life can be made.

The late Edgar Sydenstricker more than any other individual was responsible for the inclusion of public health in the national program of social security. He has said:

> The program of public health in its broad as well as its narrower sense should be designed to meet the peculiar needs of the individual community rather than to conform to any standard pattern.—The practical coordination of efforts does not necessarily imply public control of such efforts nor the centralization of control or administration. On the contrary, it is assumed that different communities or the individuals composing such communities may discharge its responsibility each in its own way or ways.

I have said that our social concepts are changing, and among them the concept of public health. I believe that among the changes of most significance are first, that citizens are beginning to realize that an effective nation-wide program of public health with federal support is a major factor in any national effort toward economic and social security, toward individual personal security, and toward the security of our major political and social institutions; for it prevents rather than alleviates much disability, dependency, and insecurity.

Second, and closely related, is the dawning of the idea among the public at large that it is financially important to prevent disease.

And finally, there is this great change in our own concept of our profession: Bankers may be at odds about how or when to stabilize our currency. Our greatest lawyers may disagree in fives and fours about the interpretation of the Constitution. Economists and industrialists may wrangle about the balancing of demand and production and the methods of preventing periodic unemployment. We have no part in their quarrels. *This one thing we do!* We are united in the objectives of our campaign against death and disease. We are sure of its place and importance in the growth of our nation. It is my firm belief, and yours, and by the straightforward doing of our task it can become the belief of the nation, that public health must be supported because of its *human* significance.

As President of the American Public Health Association during the coming year, it shall be my one thought that the Association may be serviceable to our purpose.

Importance of the Supervisor in the Industrial Health Program*

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MUCH of the time and interest of the Industrial Hygiene Section of the American Public Health Association naturally has been given to the scientific, technical aspects of the causes and methods of control of specific occupational diseases. In the valuable discussions of such important subjects as silicosis, lead poisoning, the hazards of various other physical and chemical agents, to say nothing of such diseases as the common cold, pneumonia, and tuberculosis, and the mounting list of off-duty accidents, the important phases of industrial health administration and supervision should not be forgotten. Industrial hygiene cannot be advanced and occupational diseases and accidents cannot be controlled without an adequate set-up, both as regards program and personnel in each industrial organization.

The writer [1] has called attention at various times to the need for development of a well rounded industrial health program in each industry. At this time it would seem desirable to emphasize that one of the additional, outstanding needs in the administration or further extension of a health service, at least in the larger industrial concerns, is the setting up within the company of a completely organized personnel, and delegating the responsibility for such work. In many instances this will necessitate only the filling of certain supervisory "gaps" that exist at present. In other words, the personnel for a health service must be just as well organized in an industry as is the staff for any of the strictly operating activities, even though some of the same individuals may serve both purposes. At the same time, advisory services on health must be provided by special staff personnel, medical or otherwise, to assist the supervisors in the line organization, just as such services are available for technical engineering, manufacturing and operative problems.

In the organization of personnel for industrial health service, it is assumed that: (1) the larger the company the more specialization is possible and the greater is the necessity and opportunity for the division of positions and functions; and that (2) the smaller the company the more generalization is required and the greater is the necessity for the unification of positions and functions, and the need for possible assistance in industrial health work from local health departments or associations. The development of a practical and comprehensive program for health supervision of employees of smaller business concerns probably is

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the greatest unmet need in the whole realm of industrial health administration.

HEALTH RESPONSIBILITIES OF SUPERVISORS

The key person in the industrial health program should be the foreman or supervisor, just as the key person in the school health program is the classroom teacher. The ultimate responsibility for the health supervision of individual employees among general manufacturing and operating forces will rest with the supervisors, such as supervising foremen and foremen, chief clerks, local managers, chief operators, and other group leaders. Frequent personal contacts between a company medical department and individual workers are impracticable and often impossible. First line supervisors, however, have the opportunity to observe possible day-to-day changes in a fellow worker's physical appearance or mental attitude. The majority of supervisors are definitely interested in the welfare of their workers; it is not difficult, therefore, to get them to see that the health of their subordinates is a part of their job. The problem becomes one of developing effective supervisory methods for promoting health among employees.

The following suggestions cover the possible opportunities and responsibilities of supervisors in industry as regards the health problems of their fellow employees:

A. *To Stimulate the Ideals of Good Health*—Supervisors are acknowledged leaders. This is particularly true as regards the example set through their own conduct and attitude toward health, and in maintaining as healthy an environment as possible.

1. Their own habits of living, including recreational and outside activities, should be such as to stimulate ideals of health among their forces.

2. They should coöperate with the management in its effort to maintain such conditions as proper ventilation, heating, sanitary quarters, and hazard-free methods and equipment.

3. Their interest in company health activities should be active and genuine.

4. Their attitude toward frequent and unnecessary incidental absence on account of personal illness should be constructive and exemplified by their own good conduct in this respect.

5. In personally availing themselves of medical services provided by the company, through the regular lines of organization, they should help to build up confidence in such services.

6. They should refrain, at all times, from diagnosis or prognosis and should create on the part of their people a desire to seek proper medical advice when symptoms indicate the need of such. The confidences of individual employees should be carefully safeguarded.

B. *To Detect Indications of Potential Ill Health Among Employees*—

1. Evidences of minor ailments or warning signals such as continued colds, coughing, sneezing, headaches, indigestion, toothaches, inability to maintain a good posture, skin eruptions, abnormal skin color, noticeable loss of weight, shortness of breath, chronic fatigue, and any other conditions which obviously point to a " below par " or recently changed condition should be noted by the supervisor.

2. Poor quality of work, unsatisfactory mental attitude, friction with other employees, particularly supervisory people, which cannot be traced to the commonplace events of everyday working conditions, may indicate severe mental or nervous strain due to a multiplicity of causes which should be investigated.

3. Frequent absences from work reported as due to incidental ill health; repeated use of rest rooms; and

irritation at or inability to tolerate comfortably adequate and reasonable ventilation and proper heating arrangements should be recorded.

C. *To Take Proper Action With Regard to Unsatisfactory Conditions*—

1. Supervisors should advise employees to seek proper medical and dental attention for correction of minor defects.

2. Consultation and coöperation with available medical and dental advisers in individual cases should be arranged.

3. After determination has been made of the causes of repeated incidental absences, and the causes of poor mental attitude, preventive measures should be adopted.

4. Emergency action should be taken with reference to employees exposed to or exhibiting apparent symptoms of either occupational or communicable disease until the facts can be secured.

5. Observation of employee's attitude and appearance for some time after return to work following absence due to sickness should be a part of the supervisor's routine. The supervisor's interest and responsibility should be continuous and should not end when a worker has been referred to a physician or the company medical department.

HEALTH TRAINING OF SUPERVISORS

Modern industry requires that the supervisor must have a fairly complete understanding of the physical and mental needs of the individual workers under his charge, in addition to having a thorough knowledge of the job itself and of its possible disease or accident hazards. Thus, the subject of health must have a prominent place in any present or future program of supervisory training, and before any real progress can be made in individual health supervision, the supervisors themselves must be taught not only the facts of life and health, if they do not know these, but also how to impart such knowledge to others, and what their real responsibilities are as to the health of their working forces.

The health of the supervisor himself or herself is of paramount importance, not only as regards the quality of supervision, but also as it affects relationship to individual employees. The management officials of industrial organizations, where feasible, should provide thorough physical examinations of all supervisors and an adequate system for the follow-up and correction of defects and impairments which are found. Starting with the supervisor's own health and working environment is the best point of departure for the development of the entire industrial health program. Moreover, it is certain that unless the supervisor is " sold " on health, few if any of his or her fellow workers will become health-minded. As a matter of fact, the health program in industry must be developed from the top down, so far as officials and workers are concerned, rather than to attempt to push it from the bottom upward through the lines of organization.

Where practicable and feasible, all supervisors or prospective supervisors should be taught the principles of mental hygiene in order that they may form wise mental habits of their own, and that they in turn may be proper guides to their working forces. In this way the number of maladjusted supervisors and workers may be markedly reduced.

Supervisory training on health may be carried on through (1) short courses, conferences or periodic written instructions for supervisors already in service; or (2) systematic training and organized instruction on health in connection with job training for new employees and prospective supervisors. Supplying facilities, materials, and equipment for the use of supervisors in connection with their training and to enable them to carry on their duties as health counsellors to their workers, is

an important phase of management's responsibility.

As an example of one form of health training for supervisors, reference is made to a plan inaugurated a few years ago by the American Telephone and Telegraph Company and Associated Operating Companies in the Bell System in order to be of assistance to supervisors in fulfilling their opportunities as regards the health problems of employees. A series of so-called "Health Supervision Instructions," in mimeographed form, have been sent out at intervals of about a month for wide distribution to men and women supervisors in the various departments. These have covered such subjects as The Common Cold; Ventilation; Common Ailments, such as Headaches, Skin Disorders, Nervous Disorders, Indigestion, and Constipation; Healthful Vacations with emphasis on protection against sunburn, poison ivy, and so-called vacation typhoid; Mouth and Dental Hygiene; Food and Health; and Preventable Disease Control. Evidence is available which would seem to indicate that such periodic "Health Supervision Instructions" are of very great value to supervisory people in their daily tasks of dealing intimately with the personal health problems of individual workers; it is a method which apparently may fill an important place in the industrial health program, particularly when formal group or class health training is impossible.

In closing, it may be stated that if the working forces in industry are to become health-minded, the supervisory organization must assume the leadership. In carrying on his or her duties the supervisor needs the support and assistance of operating management and of the health specialists, such as doctors, dentists, engineers, nurses, and nutritionists, but the results achieved will depend largely upon the supervisor's own efforts. In former times health was neither an industrial subject nor objective; the manufacturing or operating supervisor concerned himself or herself with job routine only and was not supposed to assume any responsibility for the health status or safety of fellow workers. At the present time, with industrial health becoming something more than control of specific occupational hazards, personal health guidance of working forces should become an essential part of supervisory routine. The industrial supervisor of the future must have a dual responsibility—that toward the actual work at hand and that toward and with the worker supervised; he will promote not only industrial safety, but industrial health as well!

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Industrial Hygiene Activities in the United States*

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THE United States Census for 1930 shows that, at that time, there were approximately 49 million persons gainfully employed in the United States. Of this number, manufacturing, mechanical and mineral industries accounted for nearly 15 million workers. If the term "industrial hygiene" means the protection of the health of the worker, it is at once apparent that it is a major problem in public health.

More important than specific occupational diseases associated with the industrial environment is the fact that the incidence of other diseases, such as tuberculosis, pneumonia, and degenerative conditions, are greater among the industrial workers than the general population. It has also been shown that the life expectancy of the industrial worker is less than that of the nonindustrial worker.

In recent years large industrial establishments have contributed much toward the protection of the health of their workers. However, as nearly 90 per cent of the plants in the United States employ less than 100 persons, many establishments are not prepared to handle effectively the problem of industrial hygiene alone. It would seem, therefore, that the protection of the health of our workers is indeed an important health function and one which can be handled best through a governmental agency, such as a state or local department of health coöperating with the employers and workers.

PRESENT TRENDS IN INDUSTRIAL HYGIENE

Responsibility for safeguarding the health of industrial workers rests chiefly with state and local governments. The federal government's agencies concerned with industrial hygiene are engaged in collection and dissemination of information, conducting field studies, laboratory research, and protection of the health of federal employees.

The branches of the federal government engaged in this field, together with their respective activities, are as follows:

1. The Department of Labor, through its Children's Bureau, Women's Bureau, Bureau of Labor Statistics, and the recently created Division of Labor Standards, confines its activities to the collection of statistics on accidents, occupational diseases, wages, hours of labor, employment trends, and allied subjects. Through coöperation with the several states, the Department of Labor attempts to secure uniform laws, regulations, and practices for the protection of employed persons.
2. Studies in the mineral and allied in-

* Read at a Joint Session of the Industrial Hygiene and the Public Health Engineering Sections of the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 23, 1936.

dustries have been conducted for many years by the Department of the Interior, Bureau of Mines, for the purpose of promoting the health and safety of workers employed in these industries.

3. In the Treasury Department, the Public Health Service, Office of Industrial Hygiene and Sanitation, conducts studies concerned with the health of industrial workers. Particular attention has been given to industrial dusts, specific industrial poisons (notably lead, radium, benzol, and carbon monoxide), dermatoses, ventilation, illumination, and industrial morbidity and mortality. Investigations of both field and laboratory type are made. These are designed to yield information regarding the extent and nature of a particular hazard throughout industry and to devise control methods. The investigations are made in coöperation with state and local authorities and the data obtained serve to guide industrial, as well as governmental establishments, in coping with occupational diseases.

On behalf of state and territorial health officers, the Public Health Service has been instrumental in bringing about agreements with the chemical industry beneficial to the health of those working in the industry, and also to those using its products. The agreements cover such poisonous materials as tetraethyl lead, methanol, liquid chlorinated hydrocarbons, carbon tetrachloride, carbon disulphide, and aniline oil. Standards of health and safety are developed through the coöperative efforts of the Public Health Service, Bureau of Mines, Department of Labor, and American Standards Association.

Compensation of civilian federal employees for injuries or diseases proximately caused by conditions of employment is administered by the independent Employees Compensation Commission. Medical personnel needed for administrative purposes in this work are provided by the Public Health Service.

Except for federal and territorial employees, legal protection of the industrially employed is a responsibility reserved by state and local governments. Prior to this year, most states have concerned themselves chiefly with matters of safety, sanitation, employment of women and children, and compensation of employees following accidents. All but two states have workmen's compensation legislation for accidental injuries, and approximately 15 states provide compensation for one or more occupational diseases. Administratively, the states have placed enforcement of occupational disease legislation in various departments. Several states require reporting of occupational diseases.

As will be developed in this discussion, the past year has seen a rapid growth in the establishment of industrial hygiene units in health departments. There has also been a realization, upon the part of those responsible for the administration of occupational disease units, that a coöperative program among the various governmental agencies involved is desirable for effective progress in this important phase of public health.

So far a brief summary has been presented of the activities of various governmental or official agencies. An increasing amount of interest in both the study and control aspects of occupational diseases has also been manifested by nonofficial agencies, particularly large industrial establishments, insurance companies, as well as universities and national organizations directly interested in public health, notably, the American Public Health Association, the American Medical Association, the National Safety Council, and the National Tuberculosis Association. Not only have industrial establishments shown a great deal of interest in this subject, and in many instances inaugurated programs of industrial hygiene, but there has also been an awakening on the part of the worker himself to the need for coöperation in the control of industrial health hazards.

In many of the studies conducted by the Public Health Service and other agencies, the workers have shown an excellent coöperative spirit and have submitted themselves for complete medical examinations in order that the etiology and control of industrial health hazards might be determined by scientific means.

Students of the industrial hygiene and sanitation problem have long realized that actual progress in this field could be made only through a concerted effort by both state and local governments. Although many state health officials realized that industrial hygiene was an integral part of their health activities, they were unable to cope effectively with this problem, due to the lack of funds and interest on the part of those persons most directly concerned. For many years the Conference of State and Provincial Health Authorities of North America have sustained interest in industrial hygiene through their Committee on Industrial Hygiene. Passage of the Social Security Act at once made necessary funds available for the extension of this phase of public health in various states. Accordingly, the Public Health Service, in coöperation with the Industrial Hygiene Committee of the Conference of State and Provincial Health Authorities inaugurated a program designed for the purpose of establishing active industrial hygiene units in the health departments of various industrial states.

TABLE I

CLASSIFICATION OF STATES ACCORDING TO THE POPULATION AND NUMBER OF GAINFUL WORKERS IN EACH STATE, AND NUMBER AND PER CENT IN MANUFACTURING, MECHANICAL, AND MINERAL INDUSTRIES, U. S. CENSUS, 1930

State	*Total Population*	*No. of Gainful Workers*	*Number of Gainful Workers in Manufacturing, Mechanical and Mineral Industries*	*Per Cent of Gainful Workers in These Industries*
New York	12,588,066	5,523,085	1,995,924	36.0
Pennsylvania	9,631,350	3,722,428	1,796,944	48.2
Illinois	7,630,654	3,184,875	1,164,979	36.5
Ohio	6,646,697	2,615,938	1,094,650	41.8
Michigan	4,842,325	1,927,498	860,164	44.6
Massachusetts	4,249,614	1,814,422	840,300	46.2
New Jersey	4,041,334	1,712,125	741,299	43.3
California	5,677,251	2,500,969	673,646	27.0
Indiana	3,238,503	1,251,177	464,549	37.3
Texas	5,824,715	2,207,118	395,802	18.0
Missouri	3,629,367	1,458,054	390,399	26.8
Wisconsin	2,939,006	1,129,546	380,229	33.6
Connecticut	1,606,903	677,292	337,445	49.8
North Carolina	3,170,276	1,141,129	289,917	25.4
West Virginia	1,729,205	570,459	242,115	42.5
Georgia	2,908,506	1,162,174	240,989	20.7
Maryland	1,631,526	672,906	228,599	34.0
Washington	1,563,396	664,813	181,765	27.4
Rhode Island	687,497	297,168	164,304	55.2
Maine	797,423	308,617	104,201	33.5
New Hampshire	465,293	192,671	89,461	43.8
Arizona	435,573	165,304	45,811	27.7
Vermont	359,611	141,190	42,851	28.4
Delaware	238,380	98,104	35,348	36.0

TABLE II

CLASSIFICATION OF STATES ACCORDING TO THE POPULATION AND NUMBER OF GAINFUL WORKERS IN EACH STATE, AND NUMBER AND PER CENT IN MANUFACTURING, MECHANICAL, AND MINERAL INDUSTRIES, U. S. CENSUS, 1930

State	*Total Population*	*No. of Gainful Workers*	*Number of Gainful Workers in Manufacturing, Mechanical and Mineral Industries*	*Per Cent of Gainful Workers in These Industries*
Virginia	2,421,851	880,276	221,539	25.1
Alabama	2,646,248	1,026,320	220,378	21.4
Kentucky	2,614,589	907,166	220,233	24.0
Tennessee	2,616,556	958,209	213,077	22.2
Minnesota	2,563,953	992,847	210,299	21.2
Oklahoma	2,396,040	828,029	172,163	20.8
Iowa	2,470,939	912,832	167,147	18.3
Louisiana	2,101,593	815,725	156,030	19.1
South Carolina	1,738,765	687,721	146,344	21.3
Kansas	1,880,999	694,276	132,662	19.0
Florida	1,468,211	599,010	131,480	22.0
Oregon	953,786	409,680	102,125	25.0
Colorado	1,035,791	402,894	88,830	22.2
Arkansas	1,854,482	667,870	83,560	13.1
Mississippi	2,009,821	844,887	79,318	9.4
Nebraska	1,377,963	507,022	71,517	14.1
Utah	507,847	170,013	44,977	26.5
Montana	537,606	216,471	44,637	20.6
Idaho	445,032	162,223	27,934	17.2
South Dakota	692,849	247,678	24,207	9.8
New Mexico	423,317	142,866	23,931	16.7
Wyoming	225,565	92,451	19,046	20.7
North Dakota	680,845	240,317	18,095	7.5
Nevada	91,058	42,885	11,776	27.4

The following discussion presents certain information on what has been accomplished to date in establishing industrial hygiene units in the various state and local health departments.

Tables I and II represent an attempt to classify the states according to population and the number of gainful workers in each state, as well as the number and per cent in manufacturing, mechanical, and mineral industries. The order in which these states are presented is based on the number of persons employed in these three industries. However, in order to take into consideration those states having small but highly industrialized populations, there has been included in Table I a list of these smaller states.

A study of Tables I and II shows that approximately 49 million persons were gainfully employed at the time of the last decennial census. Of this number, manufacturing, mechanical, and mineral industries accounted for 15 million workers. The occupational exposures known to exist among this large group of workers embrace more than 500 poisonous materials and hazardous conditions which may be detrimental to health. In fact, as previously stated, numerous studies of the health of industrial workers which have been made by the Public Health Service and other agencies show that certain of these workers experience high morbidity and mortality rates and that the industrial occupation is an

important factor in the causation of excessive illness and mortality rates.

Experience has indicated that, in order to carry out an effective program of industrial hygiene, certain minimum activities are essential. For the sake of brevity, these activities have been divided into administration and field investigations, as presented below.

ADMINISTRATION

1. Arrange for securing and investigating reports of occupational diseases to the state department of health.
2. Secure reports of all diseases for which sick benefits are paid by industrial sick benefit organizations in the state department of health.
3. Coöperate and provide a source of information for other state departments, such as industry, labor, insurance, and medical interests, or any agency interested in industrial hygiene.
4. Educational program to acquaint industry and various groups interested as to importance of the problem.

FIELD INVESTIGATIONS

1. Preliminary survey to determine the scope and nature of the industrial hygiene problems in the state.
2. Surveys by field personnel of plant conditions causing or suspected of causing occupational diseases, in order that the department may advise or make recommendations for the control of existing or potential health hazards.

It is believed that the functions given herein are sufficiently clear to require no further elucidation. Although there may be many other activities in which an industrial hygiene unit may take part, it is felt that the tentative program just outlined should serve as a starting basis.

The outline map which follows indicates graphically the progress which has been made by the Public Health Service in the establishment of industrial hygiene units in health departments.

Prior to 1936 there were only 5 state departments of health conducting industrial hygiene activities, these activities being of a limited nature. This number has been increased to 17, and it is felt that many more states will soon include industrial hygiene as one of their functions.

INDUSTRIAL HYGIENE UNITS IN THE UNITED STATES

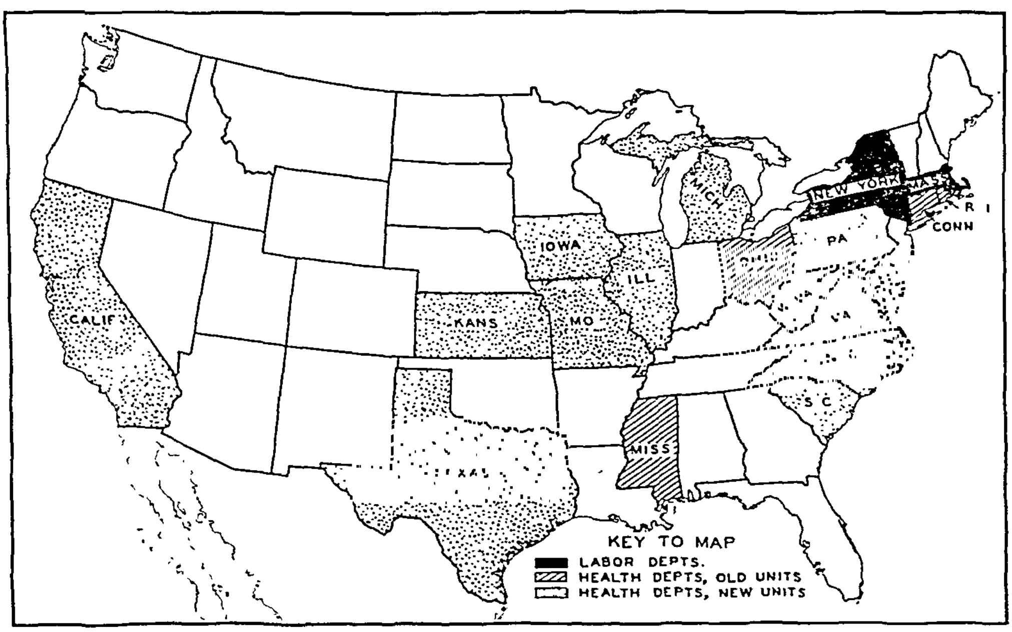

TABLE III

INDUSTRIAL HYGIENE ACTIVITIES IN CERTAIN STATE HEALTH DEPARTMENTS

State	Number of Gainful Workers	Annual Budget: Prior to 2/1/36	Present or Proposed: Total	Present or Proposed: Per Worker
California	2,500,969	......	$7,720	0.003
Connecticut	677,292	$11,927	24,295	0.031
Illinois	3,184,875	......	28,250	0.009
Iowa	912,832	......	9,600	0.010
Kansas	694,276	......	9,600	0.014
Maryland	672,906	7,000	12,000	0.018
Michigan	1,927,498	......	42,400	0.022
Mississippi	844,887	4,500	6,200	0.007
Missouri	1,458,054	......	16,680	0.011
North Carolina	1,141,129	......	27,500	0.024
Ohio	2,615,938	5,200	33,200	0.013
Pennsylvania	3,722,428	......	40,220	0.011
Rhode Island	297,168	2,250	23,000	0.077
South Carolina	687,721	......	10,800	0.016
Texas	2,207,118	......	23,100	0.010
Virginia	880,276	......	14,900	0.017
West Virginia	570,459	......	19,000	0.033
Total	24,995,826	$30,877	$348,465	0.014

1. The States of New York and Massachusetts have Industrial Hygiene Divisions in the Labor Department, so that in all, 32,333,333 gainful workers are provided with industrial hygiene facilities; there are still 16,255,397 workers who are not provided with industrial hygiene services.
2. In 1934, New York State alone paid out $531,808 in compensation for occupational diseases.

Perhaps a better conception of the growth in this field may be had from a study of Table III. Prior to the passage of the Social Security Act, only $30,877 was being expended by the 5 states carrying on industrial hygiene in health departments. The latest budgets for industrial hygiene in the 17 states and cities carrying on this type of activity are now approximately $350,000, or more than 10 times the amount expended heretofore. However, even this increased expenditure shows a per worker cost of only 14 mills, an amount rather negligible when considered in the light of expenditures for other public health activities. When we realize that New York State alone paid out $531,808 in compensation during the year 1934 for occupational diseases which are in a large measure preventable, then we know that even our present growth for this activity is none too great. A further study of Table III shows that nearly 33 million gainful workers are now being provided with industrial hygiene facilities, leaving approximately 16 million persons

TABLE IV

MINIMUM REQUIREMENTS FOR STATES HAVING A SMALLER INDUSTRIAL POPULATION

(¼ million or less industrial workers)

Personnel	*Cost*
1 Physician Director	$5,000–$6,000
1 Industrial Hygiene Engineer (chemical engineer)	3,000– 3,600
1 Chemical Engineer (laboratory and field)	2,400– 3,000
1 Stenographer	1,200– 1,500
Equipment	4,800
Supplies	1,000
Travel	2,000
Total cost:	$19,400–$21,900

for whom no such provisions have as yet been made.

Tables IV, V and VI present the minimum requirements for various states in the way of personnel, equipment, and annual expenditures. These lists should be considered as very flexible and are to be modified with the particular needs of each locality. They are offered merely as a working basis for those states about to inaugurate industrial hygiene programs.

One of the serious problems which confronted the Public Health Service in connection with establishing industrial hygiene units in state departments of health was the shortage of trained personnel. It is well recognized that the practice of industrial hygiene and sanitation requires highly specialized training. A doctor or engineer undertaking this type of work should not only have a thorough grounding in public health work, but should also be well trained in such subjects as ventilation, illumination, industrial toxicology,

TABLE V

MINIMUM REQUIREMENTS FOR STATES HAVING LARGE INDUSTRIAL POPULATIONS

Personnel	*Cost*
1 Physician Director	$5,000– $7,500
1 Assistant Physician	4,500– 6,000
1 Industrial Hygiene Engineer (chemical engineer)	3,600– 5,000
1 Industrial Hygiene Engineer (ventilation engineer)	3,600– 5,000
1 Stenographer	1,200– 1,500
Equipment	
(A laboratory for carrying on industrial hygiene studies by the Engineering Section of the Bureau)	2,500
Physician's Equipment	
(X-ray, microscope, etc.)	4,000
Supplies	1,500
Travel	3,000
Total cost:	$28,900–$36,000

TABLE VI

CONTEMPLATED PERSONNEL AND BUDGET FOR A LARGE INDUSTRIAL STATE

Personnel	*Cost*	
1 Physician Director	$7,500	
1 Chief Industrial Hygiene Engineer	6,000	
3 Physicians, at $5,000	15,000	
1 Ventilation Engineer	4,000	
3 Chemical Engineers, at $3,000	9,000	
1 Chief Chemist	4,000	
1 Assistant Chemist	2,500	
1 Statistician	3,500	
1 Nurse	2,000	
2 Medical Technicians, at $2,000	4,000	
2 Engineering Technicians, at $1,500	3,000	
5 Stenographers, at $1,500	7,500	
Total salaries:		$68,000
Laboratory Supplies and Equipment		
Equipment	$7,500	
Supplies	2,500	
Travel	7,500	
Miscellaneous	1,500	
Total:		19,000
Grand Total:		$87,000

dust determinations, and various other specialized subjects pertaining to industrial health. Perhaps it may be well to consider the duties and qualifications that have been suggested by the Industrial Hygiene Committee of the Conference of State and Provincial Health Authorities of North America for the chief medical and engineering personnel of such a unit. According to this committee, the duties of the medical director of such a unit are given as:

> Under administrative direction, to plan, correlate, and direct the activities of the Bureau of Occupational Diseases of the Department of Health; and to do related work as required.

For minimum qualifications this committee gave the following requirements:

Graduation in medicine from an institution of recognized standing, preferably with specialization in industrial hygiene and training in public health, a license to practise medicine, and 2 years' graduate work in industrial hygiene including ventilation, illumination, industrial toxicology, and methods of dust determinations, and 3 years' experience in public health work in relation to effect of industrial environment on health—at least 1 of which shall have been in directive capacity, or any equivalent combination of education and experience; advanced knowledge of the principles and practices of medicine and surgery, with particular reference to the control and elimination of industrial hazards and occupational diseases; especial ability to diagnose occupational diseases and to ascertain the specific causes of such diseases; ability to make comprehensive analyses of health conditions in industries, to draw adequate conclusions, and to prepare clear and informative reports for publication; initiative; tact; good judgment; and good address.

The duties of the industrial hygienist or industrial hygiene engineer were given as—

To determine, under direction, the necessity of making specific studies of particular industrial conditions; to conduct surveys and supervise studies of factory conditions predisposing to occupational diseases; to prepare comprehensive reports of findings with recommendations for control of occupational disease hazards; to supervise the work of field and laboratory workers; and to do related work as required.

The minimum qualifications called for—

Graduation in chemical engineering, with 2 years' graduate work in industrial hygiene: to include ventilation, illumination, industrial toxicology, dust determinations; 3 years' experience in surveys and studies of industrial conditions for occupational disease control; or any equivalent combination of education and experience; familiarity with materials and processes used in industry; thorough knowledge of physical and chemical procedures for necessary determination of occupational disease hazards and of methods of control of these hazards; ability to recognize industrial processes and materials presenting potential occupational disease hazards; ability to establish contacts with plant executives; ability to enlist coöperation of plant executives, foremen and laborers; initiative; tact; good judgment; and good address.

During the next few years personnel trained in industrial hygiene and sanitation will be more and more in demand. The various universities engaged in teaching public health should give serious consideration to the inclusion in their curricula of rather comprehensive courses in industrial hygiene and sanitation. As a matter of fact, some of our leading universities are already cognizant of this need and are now planning to give intensive courses in industrial hygiene, either as part of their medical curriculum or to include such courses in their schools of public health and hygiene.

To overcome the present lack of trained personnel in the 17 states which have just inaugurated industrial hygiene programs, the Public Health Service has evolved the following procedure: Since one of the prerequisites for a career in industrial hygiene is that an individual should have a background of public health, it has been suggested to the various state health officers that they consider transferring one of their physicians and one of their sanitary engineers to this new activity, and by giving them an intensive course in industrial hygiene, help them to undertake this new field of endeavor. This particular plan also has an advantage in that the individual is a resident of the state, and in all probability is thoroughly familiar with its industries, and the policies of the state department of health and other state agencies. Such a procedure has been especially successful in some of the states where industrial hygiene units have already been established.

In order to introduce these individuals to industrial hygiene procedure, the Public Health Service conducted a seminar for physicians and engineers from state health departments. The

attendants at this seminar included 33 physicians and engineers from 17 states. It is realized, of course, that 1 month's lectures and laboratory demonstrations only served to introduce these students to the subject of industrial hygiene. Therefore, it is planned to supplement this course by actual aid to the various states, in order that the personnel may obtain advice and training under practical working conditions. It is proposed that demonstrations in industrial hygiene may be conducted in various industries in the states. One such demonstration has already been completed in North Carolina, where the Public Health Service, in coöperation with the new Industrial Hygiene Division of that state, conducted a study of asbestosis in certain asbestos textile plants. Similar aid is being given to the State of West Virginia, and it is hoped to extend such service to other states which may call on the Public Health Service for aid in initiating this new activity. With such a plan, it is possible to perform a dual function; namely, the Office of Industrial Hygiene and Sanitation of the Public Health Service will be conducting field studies among the industrial workers, designed for the purpose of yielding information on the extent, nature, and control of certain hazards, and at the same time will be aiding the state personnel in obtaining first-hand training in the conduct of industrial hygiene activities.

FUTURE DEVELOPMENTS IN INDUSTRIAL HYGIENE

The past few years have shown a tremendous interest and activity on the part of the health departments and other agencies in the field of industrial hygiene and a realization that, in order to improve the health of the worker, a coöperative effort should be made by all those responsible for safeguarding the health of the working population. During the past year the number of state and city departments of health carrying on an effective program in industrial hygiene has increased to the point where nearly two-thirds of the working population are receiving some consideration on industrial health problems. Present trends indicate that more states will gradually undertake such work, rendering effective service to industry, labor, and other agencies interested in such a program. It is realized, of course, that this development will necessarily be slow, but there is no reason to feel that it will ever retrogress. Industrial hygiene has come to stay, and should be one of the most active fields of public health in the near future. The Public Health Service will be glad to have the various states look to it for guidance and assistance. As an aid to such a program, members attending the recent seminar unanimously voted that a conference of official industrial hygiene workers be formed. The objects of this conference would be to promote industrial hygiene and sanitation in all its aspects and phases, to coördinate industrial hygiene and sanitation activities in official federal, state, and local and territorial organizations; to encourage interchange of experience among industrial hygiene workers in official administrative positions; to collect and make accessible to all industrial hygiene workers in official administrative positions such information and data as might be of assistance to them in the proper fulfillment of their duties. Plans for such a conference are now under way.

With the increased service by the state agencies to industry in solving the manifold problems of industrial hygiene, the Public Health Service should be able to devote more of its time to much needed research in the field of industrial toxicology, and to those field studies of a broader nature designed

to evolve standards to be applied by local governmental agencies. The combined efforts of the federal and local governments should bring about a definite improvement in the health of the industrial worker.

What Is Scarlet Fever?

DURING recent years bacteriologists have been very active in their efforts to throw light on the nature of the infection in scarlet fever and allied diseases. The great increase in new forms and types of streptococci, and the ingenuity displayed in their nomenclature—well described by Topley and Wilson as a "riot of christening"—are sufficient to confuse the physician who is faced with the actual clinical and administrative problems connected with these diseases. There is conclusive evidence that uncomplicated scarlet fever is due to infection by one or other of many different strains of the haemolytic streptococcus; but organisms with the same morphological and biochemical reactions are to be found, not only in widely varying forms of disease and in those who have recovered from these diseases, but also in anything up to 36 per cent of apparently healthy persons.

The Dick test and the Schultz-Charlton reaction may be useful in diagnosis; but they are of limited value, and least reliable in the very type of cases in which their help is most needed. On what, then, is the clinician to rely in trying to arrive at a diagnosis?

Medical practitioners have always regarded the typical scarlatiniform punctate erythematous rash as the diagnostic feature *par excellence*, and subsequent consistent desquamation as clinching the diagnosis; but experienced observers have always been baffled to find patients with typical rash and strawberry tongue who did not peel, and other patients with typical peeling who have had no previous rash.

In a recent bacteriological investigation of 100 suspicious cases, Brown and Allison found that the incidence of rashes was almost equal in the bacteriologically positive and negative cases; that evidence from the tongue, temperature, and pulse-rate was of no diagnostic value; and that only 40 per cent of the positive cases eventually showed consistent desquamation.

Even after the most thorough clinical and bacteriological investigation, the diagnosis of scarlet fever may be beset with extreme difficulty; and with the mild type of the disease now prevalent it is recognized to be one of the most difficult to diagnose of all infectious diseases. It is the busy general medical practitioner, however—with little or no time and facilities for bacteriological and serological tests—who has the responsibility of not only diagnosing but notifying a condition which cannot be regarded as a specific epidemiological entity. It is, therefore, not a matter for surprise that in a large percentage of patients, notified and admitted to hospital, the diagnosis of scarlet fever is not confirmed—Brown and Allison estimate that 39 per cent of doubtful cases of scarlet fever are not infectious and do not require hospital treatment of any kind. —Andrew W. Forrest, M.A., M.D., Ch.B. (Edin.), D.P.H., Scarlet Fever Control on Modern Lines. *Pub. Health*, 49, 12:412–13 (Sept.), 1936.

employees 25 years ago, the circus immediately adopted and still rigidly adheres to the policy of requiring every employee to be vaccinated against smallpox.

SANITARY EQUIPMENT AND PRACTICES

The conditions found in the sanitary survey are summarized in the following: *

1. WATER (SOURCE)

The advance men, or so called "24-hour men," make a contract in each city for water to be furnished on the day or days that the circus is to be at that locality. Usually it is a municipally owned water supply, but sometimes it is owned by a private water company under municipal control. No specifications as to standard of purity were included in the contract.

Water on the circus grounds is used for the following purposes: (a) For drinking water and other domestic use in the cookhouse and about the grounds; (b) for watering the animals; and (c) for sprinkling. Safety of the water is much less essential for the latter two purposes than for the first, except for the fact that men in the horse "tops" commonly drink from the same bucket from which the horses are served. All tanks on wagons and trucks on the circus grounds were filled from the top by means of a fire hose inserted into the tank.

The method of serving drinking water was found to be exceedingly crude in most instances, the prevailing custom being to use a barrel, keg, or bucket with ice immersed in the water, and the water was served to the individual by means of a common dipper or cup.

Water on the Sleeping Cars—Each sleeping car is equipped with overhead tanks averaging about 300 gallons per car. Water from these tanks is said to have been used for lavatory purposes only. These tanks are filled ordinarily from the railroad yard supply, which is separate from that from which the circus lot supply is derived. Water for filling the car tanks is secured by means of direct hose-to-hose connection with the city supply. There is a permanent hose line installed on top of cars so that the nozzles emptying into the storage tanks never come in contact with surface dirt or filth.

Drinking water on the cars was said to be derived entirely from ice placed in coolers and allowed to melt. There are abundant indications, however, that, during the extremely hot weather, the melting ice did not furnish sufficient water to meet the demands, and that it was supplemented by water from storage tanks, which was in all probability safer for drinking purposes than water from melted ice, as the ice was necessarily subjected to contamination by handling. Water drawn from the coolers was served to the individuals by means of cups and glasses used more or less in common with other occupants of the car.

2. LATRINES (ON THE CIRCUS GROUNDS)

Nothing worthy of the name of latrine was found. It was customary to dig a shallow trench or none at all over which was installed a straddle bar or, in a few instances, a seat arrangement, with no attempt to exclude flies. The principal function of the so-called "latrine," however, was to afford privacy from public view by means of canvas side walls.

Toilet Facilities on the Cars—The cars were equipped with galvanized iron buckets swung under each toilet commode for use when the cars were parked. No disinfectant or fly repellent was used. The contents of these con-

* Extract from "A Report on an Epidemic of Typhoid Fever in a Circus," by K. E. Miller, Senior Surgeon, and H. E. Miller, Special Expert, U. S. Public Health Service.

tainers were supposed to be disposed of by earth burial, but there are grounds for speculation as to the efficiency of this service.

3. COOKHOUSE

(a) *Dishwashing* — The equipment in each instance consisted of 2 tubs of water, 1 for washing the dishes and 1 for rinsing. The temperature of the water was ordinarily little more than lukewarm. Both wash and rinse water became heavily charged with food particles, so that the solution commonly resembled a thick soup. Dishes withdrawn from the rinse water were seen to have numerous food particles still clinging to them. Dish towels soon became water-soaked and laden with grease and food particles.

(b) *Protection Against Flies*—Bread and other food supplies on the tables and in the kitchen were not sufficiently guarded against flies.

(c) *Food Handlers*—Cleanliness of outer garments and personal cleanliness were found considerably below standard. The custom in serving meats and many other foods to the plates was by the hands direct, without the use of serving forks or other suitable instruments. Physical examination of food handlers had not been carried out, and no stool examinations for typhoid carriers had been made. Mixed garbage and refuse of all kinds were disposed of by dumping on the surface of the ground.

4. TYPHOID INOCULATION

No effort had been made to require or encourage individual antityphoid prophylaxis. Only 143 gave history of previous typhoid inoculation.

SANITARY MEASURES INSTITUTED

Although the findings fail to indicate any source within the circus itself which could have been held responsible for the epidemic, the following sanitary measures were instituted by the circus management, upon recommendation of officers of the U. S. Public Health Service, to safegard against secondary cases and provide the maximum protection for the future through precautionary practices applicable to conditions under which the circus operates:

1. The advance men were required to secure statements from the local health officer certifying that the water supply conforms to the standards for interstate traffic, that the ice contracted for is from an approved source, and that the milk is of a safe quality and pasteurized.

2. Water was required to be taken only from hydrants designated by a responsible employee of the water company and opened by him personally or by his representative.

3. Water tanks were remodeled so as to prevent the insertion of a hose into the tank.

4. All water tanks, storage tanks on cars, and cooler tanks were chlorinated once each week.

5. All containers for dispensing drinking water were replaced by covered coolers with spigots. The coolers were so constructed that ice should not come in contact with the drinking water.

6. The common dipper or cup was prohibited, and replaced by single service paper cups.

7. Each unit of the circus was equipped with adequate latrine facilities. Also suitable latrines were provided for public use. The latrines consist of an earth pit, usually 3 feet deep, and covered at the top by a collapsible fly-proof steel latrine seat. When placed over the latrine pit the earth is banked around where the bottom rests upon the ground so as to insure against the entrance of flies. The seat openings are covered with fly-tight lids. Sufficient chloride of lime is used to

repel flies, destroy odors, and disinfect the latrine contents. In the men's latrines there is an accessory urinal trench, which also is generously treated with chloride of lime. These latrines were placed under constant supervision by circus attendants. The location of these latrines must be satisfactory to the local health officer.

8. In the cookhouse, temporary improvement in the dishwashing arrangements was effected by requiring all dishes, after being rinsed, to be passed through a chlorine sterilizing bath. As a permanent measure, however, the order was placed for a dishwashing machine to be mounted in a special truck, together with its own power unit and water tanks, whereby hot and cold water can be supplied under pressure. This unit was delivered at St. Louis on August 11, and is reported to have been in constant and efficient use ever since.

Food on the table and in the kitchen was guarded against flies by coverings in so far as practicable.

Food handlers were placed under rigid supervision as regards clothing and personal cleanliness. The serving of foods by means of proper utensils was required. All food handlers were physically examined for tuberculosis, venereal disease in communicable form, and all other communicable diseases. In addition, two samples of stools and urine were taken from each to rule out any typhoid carriers. All reported positive were immediately discharged and returned home in custody of local health officers.

As regards garbage disposal, the first requirement was a separation of food refuse from tin cans and combustible material. The latter was burned before the site was abandoned. For the food refuse, an earth pit of suitable proportions was dug near the kitchen. The garbage during the day was deposited in this pit, which was covered over with earth at the end of the day. In some cities the garbage was deposited directly into garbage trucks furnished by the city.

The entire circus personnel was subjected to antityphoid inoculation.

As a surety that every phase of health protection for the circus personnel and the public will be adequately guarded in the future, the circus engaged two additional employees for the remainder of the season. One of these is a medical man to have charge of the medical phases of health protection, and the other a highly trained and experienced sanitary supervisor. The employment of a sanitary inspector has been continued.

The following regulations were prepared for the circus and have been adopted by the circus management as the standard of sanitary practice:

COOKHOUSE

1. *Water Supply*—
   - a. The drinking water shall be secured from the tank designated as drinking water supply tank.
   - b. Water for drinking shall be from the standard covered drinking water coolers, equipped for spigots for drawing water.
   - c. Drinking water shall be served only in clean individual service paper cups.
   - d. The use of the common drinking cup or dipper and the practice of dipping drinking water are expressly forbidden.
   - e. All ice used in water coolers shall be thoroughly rinsed with clean water after breaking and before being placed in coolers.
   - f. All coolers shall be kept clean at all times and thoroughly sterilized once each week in accordance with the instructions of the Superintendent of Sanitation.

2. *Food Handling*—
   - a. All food shall be protected against flies, dust, and other sources of contamination to the greatest possible extent at all times, by means of covering and through other practical measures.

b. All cookhouse employees (especially cooks and waiters) shall wear clean outer garments and present evidence of personal cleanliness. All employees handling food shall wash their hands thoroughly with soap and water before entering on duty. All cookhouse employees shall wash their hands thoroughly with soap and water after each visit to the toilet while on duty before returning to duty.

c. Wash basins and individual towels, either paper or cloth, adequate both as to number and distribution, shall be provided at all times for the use of cookhouse employees.

d. All dishes, after being washed, shall be removed from the dishwashing machine, stored, and handled in a manner to prevent soiling or recontamination.

e. Health certificates: Each food handler shall have a certificate from a properly qualified health officer attesting the fact that he is free from venereal disease in a communicable form, is free from evidence of tuberculosis or other communicable disease, and is free from evidence of being a typhoid fever carrier, as indicated by two or more successive stool cultures. The certificate shall also show that he is immune to smallpox and has been inoculated against typhoid fever in the past 3 years. The health certificate shall not be considered valid after 6 months.

3. *Garbage Disposal*—All garbage and refuse must be separated.

a. All paper, trash boxes, and other combustible material shall be collected so as to prevent a nuisance.

b. Table scraps and other organic garbage shall be collected in covered, water-tight, metal garbage cans. Distribution of cans as to number and location shall be adequate to provide for the collection of garbage at all points where garbage accumulates.

c. Except where garbage is collected from the containers by the city or some other agency which will wholly remove same from the grounds, all garbage shall be buried with at least 2 feet of earth, in accordance with instructions of the Superintendent of Sanitation.

4. In addition to the foregoing, all other practicable measures for insuring the safety of food shall be carried out at all times in accordance with the instructions of the Superintendent of Sanitation.

NOTE: In all towns the "24-hour man" shall use every effort to get a covered garbage wagon to remain at the cookhouse during show day.

FOOD DISPENSED TO THE PUBLIC

Sanitary regulations governing the cookhouse shall apply in all respects to all candy butchers and other persons in any way engaged in preparation or dispensing of food to the public, with the following exceptions:

1. When hand dishwashing is done, the dishes shall first be washed in hot water with soap or washing powders, passed through a clean hot water rinse, and again rinsed in a rinse water treated with chlorine to sterilizing strength.

2. Dish towels shall be boiled and rinsed through chlorine sterilizing solution after each use.

3. The cooling water in which all bottled goods are cooled shall at all times be treated with chlorine to sterilizing strength.

DISTRIBUTION AND SERVICE OF DRINKING WATER

1. The use of the common drinking cup or dipper and the practice of dipping drinking water are expressly forbidden. Single service paper drinking cups shall be provided in sufficient quantity at all water coolers.

2. All water coolers shall be kept clean, shall be kept covered, and shall be sterilized with hypochlorite of lime once each week, in accordance with the instructions of the Superintendent of Sanitation.

3. Circus water tank wagons shall be the only source of water supply used for filling drinking water coolers.

INSTALLATION AND MAINTENANCE OF LATRINES

1. The initial operations of setting up equipment of any department on the circus lot shall include the installation of the latrines and urinal trenches for the department.

2. Chloride of lime shall be applied to latrine trenches and urinal trenches in accordance with the instructions of the Superintendent of Sanitation.

3. The foreman in charge of the department shall be responsible for the sanitary maintenance of latrines serving the department.

FILLING TANKS AND TANK TRUCKS

1. No person connected with the circus, except those responsible for filling the tanks, shall be permitted to take water from any hydrant or other source.

2. The hydrants from which water is taken shall not only be pointed out by a responsible employee of the contracting company, or city, in person, but shall be opened by him or under his direct supervision.

3. Water for all purposes on the circus lot shall be obtained from the circus tanks.

4. All circus water tanks shall be maintained at all times in such condition as not to impair the quality of the water in the tanks or render the same unfit for drinking.

5. The hose used for filling tanks from the hydrants shall be handled at all times in such manner as to prevent the soiling or contamination of surfaces that come in contact with the water discharged into the tank.

6. All circus water tanks shall be sterilized once each week with chloride of lime in accordance with the instructions of the Superintendent of Sanitation.

WATER SUPPLY AND EXCRETA DISPOSAL FOR CARS

1. *Water Supply*—Coolers and tanks on cars shall be filled only from—

a. The approved drinking water supply source in railroad yards approved by the U. S. Public Health Service for use on Pullman and railway passenger cars, or

b. A hydrant on the public water supply system, which shall not only be pointed out by a responsible employee of the contracting company, or city, in person, but shall be opened by him or under his direct supervision.

c. The hose and other equipment used for filling tanks and coolers shall be handled in a sanitary manner, and the surfaces which come in contact with the water shall be protected against contamination from handling or by soiling with dirt or filth.

d. All ice used in coolers shall be clean artificial ice. All ice shall be thoroughly rinsed with clean water after it has been broken and before being placed in coolers.

e. All persons engaged in handling or the distribution of drinking water or in handling ice used in coolers shall conform to the requirements of the health certificate and personal cleanliness as prescribed for food handlers.

2. *Excreta Disposal*—

a. All excreta cans shall be emptied as required to prevent a nuisance.

b. Whenever the contents of excreta cans are not removed by a scavenger service in such manner as completely to remove all such material from the vicinity of the cans, the contents of cans shall be buried under a 2 foot covering of earth.

c. All excreta cans shall be treated regularly with disinfectant solution in accordance with the instructions of the Superintendent of Sanitation.

This investigation reveals a problem in sanitation in many respects peculiar in character and vast in its magnitude since it is more or less common to all circuses, carnivals, and ambulatory bodies. Carnivals probably present the most serious problem since they are more numerous, stay longer in one place, and are usually lower in scale as to equipment and character of management.

Furthermore, under the present conditions of lack of any uniformity of such state or local regulation as exists, it is humanly and economically impossible for the management of any circus or carnival that travels extensively to conform to all of the requirements and demands of all of the health jurisdictions encountered. One has only to travel with a circus a short time to become convinced of this fact. Many of the requirements imposed upon circuses by health officials are not applicable to circus conditions while others are useless and entail an immense amount of unnecessary expense.

Therefore, it is recommended that this Association appoint a committee to study the problem of the sanitary regulation of circusses, carnivals and other ambulatory bodies, and that the Conference of State Sanitary Engineers and the Conference of State and Territorial Health Officers be asked to appoint similar committees to collaborate with a committee from the

Public Health Engineering Section with a view to formulating suitable rules and regulations for the sanitary management of circuses, carnivals, and other ambulatory bodies to be recommended to all state and local health departments for adoption.

It is believed that this is one of the most urgent problems confronting health officials today, and that it can never be satisfactorily handled until state and local health officials agree upon and adopt some uniform set of requirements. Furthermore, it is believed that the managements of the various units of this vast industry will not only welcome such action, but will quite generally coöperate in the observance of reasonable, sensible uniform requirements.

More Enthusiasm for Cure than Prevention

THERE are social and economic reasons why we pay so much greater attention to individual sickness than to public health, why the pursuit of cure of disease is prosecuted so much more vigorously than the pursuit of prevention. But more important still is the absence of sensation which characterizes all real preventive work. It appeals to the intellect and not to the emotions and so fails to excite enthusiasm. The warrior, whose business is to destroy life, is loaded with honours, the physiologist, whose business is to save life, remains unknown. We had an interesting example of this in March, 1936, when on nearly the same day died our most popular admiral and the greatest physiologist of the 20th century. The politician has a more honoured calling than the dustman, but it is far less useful, for we know that if the politicians shut up for 6 months we should all breathe more freely, whereas if the dustman did, we should not be able to breathe at all. But to complain, as we often feel inclined to do, that the struggle for prevention is an up-hill game for which the public will not supply adequate funds and in which 9 persons out of 10 take little interest, is to complain of the level of human intelligence.—Dunstan Brewer, D.P.H., *Ann. Rep., Medical Officer of Health for the Year 1935*, Borough of Swindon.

The Question of Acid and Alkali Forming Foods*

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FADDISTS rampant in the realm of pseudo-science have seized upon the acid base balance of the body as an apt subject for their sophistry. As a consequence, much more is written and said on this topic than is warranted by known facts, and much that is so blandly asserted, especially for lay consumption, is distorted and incoherent.

The acid base balance is a condition in which the ratio of carbonic acid to bicarbonate in the blood is maintained in a definite state of equilibrium. Although alterations in the hydrogen ion concentration of the blood and body fluids may and do occur within certain narrow limits, such changes are due to serious disturbances of metabolism or in the functioning of body organs, usually the result of severe morbid conditions. The effects of foods on this acid base balance have been greatly exaggerated, for their influence in bringing about modifications in the chemical content of the blood is practically nil.

All foods may, of course, be classified chemically as acid forming, base forming, or potentially neutral. By calculating the equivalent in normal acid present in the form of chlorine, phosphorus, and sulphur; and the normal alkali in terms of the calcium, magnesium, potassium, and sodium in particular foods; relative values of excess potential acid or base can be expressed.

Such calculations reveal that foods of decided potential acidity include meats of all kinds, fish, shellfish, and eggs, while cereals and breadstuffs show a mild acidity. The base forming foods include most of the fruits and vegetables, with milk and cream displaying a slight potential alkalinity. The citrus fruits contain acid radicles, but these are burned in the body so that the end products are potentially alkaline. Pure fats, sugars, starches, and other foods devoid of minerals are neutral in their reactions.[1]

In the ordinary mixed diet which is the customary fare of the individual who has not succumbed to the wiles of a food fakir, the acid and base forming elements in the diet will be reasonably well balanced. According to some authorities, however, a slight preponderance of alkaline foods is desirable, possibly for the reason that normal blood is mildly alkaline, with a hydrogen ion concentration (pH) averaging 7.35.

The scientific basis for such a categorical recommendation seems, nevertheless, to be somewhat tenuous. Recent investigations reported by Bischoff *et al.*, have shown that there is no

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* Read before the Food and Nutrition Section of the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 21, 1936.

significant difference in the acid base picture of the blood of normal individuals when they are fed mixed diets containing excessively acid or excessively alkali producing foodstuffs.[2] The ingestion of a quart of milk, a quart of orange juice, or a pound of bananas, all alkali forming foods, produced not even a temporary shift in the hydrogen ion concentration of the blood plasma, or in the alkali reserve. A pound of steak, giving an excessively acid ash, caused no changes in 3 out of 4 subjects, although there was a slight temporary reduction in plasma bicarbonate in one instance.

These interesting experiments, as well as others, indicate that the daily administration of 45 gm. of sodium bicarbonate is necessary in order to raise the pH of the blood by even 0.2 and that 15 to 20 gm. of ammonium chloride are required to lower the pH of the blood by a similar amount. In order to accomplish the same results by means of food, 18 lb. of oranges would be required in the diet at one time to bring about a shift of the blood toward greater alkalinity, and 4½ lb. of lean beef, or 2 lb. of oysters, the most acid of all foods, would be necessary to produce an effect comparable to that caused by the ingestion of 15 gm. of ammonium chloride.

It is obvious, therefore, that foods consumed in the usual quantities will not alter the acid base balance of the normal person. The explanation for this phenomenon lies in the fact that the human machine is a compensatory mechanism that remains remarkably stable under different conditions. This steady state, called "homeostasis" by Cannon,[3] is maintained by means of various delicate defense mechanisms of the body.

The first and foremost of these defense mechanisms is the buffer action of the blood itself. The important proteins of the blood, hemoglobin and oxyhemoglobin, together with the blood chloride and alkaline phosphates and bicarbonate, react with the carbonic acid of the blood to establish a more or less constant equilibrium. This balance is further aided by the lungs as they dispose of carbon dioxide, the decomposition product of carbonic acid. The lung is consequently the second defense mechanism in the control of the acid base balance.[4]

The third of these body defense mechanisms is the kidney, which unlike the blood, may show a relatively wide range of acidity and alkalinity, varying in extreme instances from pH 5 to pH 8. Excessive quantities of fixed acid or alkali are eliminated through the urine, but this fine adjustment may fail in the presence of certain diseases of the kidney, so that acidosis or alkalosis may occur.

True acidosis is a symptom rather than a disease. The word is, however, a favorite one with food charlatans, who prate of the dire results from certain food combinations. Acidosis is also a popular term with the more gullible of the laity, who invariably confuse this condition with gastric hyperacidity, or so-called "acid stomach," which is due to an excess of hydrochloric acid in that much abused organ.

The accumulation in the body of an excess of acid, or the loss from the body of alkali, occurs as a rule only in certain severe ailments in which there are disturbances of metabolic processes or organic derangements. In addition to nephritis and other kidney troubles, acidosis may accompany diabetes or the diabetic coma, severe diarrhea, starvation, and acute infections, such as pneumonia and sepsis. Acidosis is apparently more common in young infants than in adults, especially in connection with infantile diarrhea, vomiting, and dehydration but, according to Paterson, acidosis or ketosis by itself

leads to little or no change in the clinical picture of the sufferer.[5]

In many clinical reports, the term "ketosis" is used interchangeably with acidosis. Although acidosis may be associated with a ketogenic, or high fat, low carbohydrate diet, ketosis itself is a condition in which there is an accumulation of ketone bodies in the blood as the result of an incomplete combustion or aberrant oxidation of the fatty acids provided by the diet. This condition, usually expressed in terms of the acetone present, is not in itself acidosis. The ketogenic diet is now used in the treatment of epilepsy, migraine, and certain other maladies.

The scientific evidence indicates, therefore, that the question of acid and alkali forming foods is a negligible problem in human dietetics. "It is still an open question," wrote Sherman (in 1932), "whether the acid base balance of the mineral elements of the diet is or is not of practical significance in human nutrition."[6] Evidence showing the relative unimportance of the effects of acid ash and alkaline ash foods has been ably summarized in the Report of the Committee on Nutritional Problems of the American Public Health Association for 1935–1936.[7]

Despite this evidence, food fakirs continue to exploit the alleged dangers of acid foods, and rant over the chimerical hazards of incompatibility in foods. One widely publicized system of diet is based on the erroneous theory that proteins and starches, and fruits and starches should not be mixed in any one meal. As a reason for this perverted idea, it is declared that protein digestion takes place in the acid contents of the stomach, while starch can be digested only in the alkaline intestine, and that carbohydrates encounter some sort of baleful interference when associated with protein in the stomach.

The fallacy of this weird notion will be readily apparent to anyone possessing even a rudimentary knowledge of physiology, but the fallacy has also been exposed in a number of recent scientific experiments. Thus, Rehfuss has shown from gastric analyses of 50 individuals that there is no incompatibility between proteins and carbohydrates in the stomach,[8] and Shay *et al.*, have recently reported, from gastric secretory studies on 5 subjects, that mixtures of protein and carbohydrate not only do not interfere with gastric secretion, but that carbohydrate digestion in the stomach is actually prolonged and encouraged by its mixture with protein.[9]

As pointed out by Rose,[10] an avid public gloats in a belief in magic as applied to human nutrition. Food fads fostered by quacks and ignoramuses, some of whom can claim "M.D." degrees, are espoused and religiously followed by a host of deluded persons. It is the duty of public health officials, as the logical educators of the public in sensible hygiene, to aid in debunking fads and follies, such as the belief that acidosis results from acid foods, and that foods of different chemical compositions can upset the acid base balance of any normal person.

SUMMARY

Although foods may be classed as (1) acid forming, (2) alkali forming, or (3) potentially neutral, there is no scientific evidence to indicate that any one food or combination of foods can significantly alter the acid base balance in a normal individual.

Acidosis is a symptom in certain morbid conditions, but the nature of the diet plays no appreciable part in the development of acidosis, despite the fallacious arguments of food charlatans who exploit unscientific systems of dietetics predicated on excessive acid

forming foods, or on the incompatibility of various food elements.

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Upper Potomac River District

. . . Provisions were made by the 1935 General Assembly for the creation of the Upper Potomac River Commission for the purpose of conserving, regulating, and controlling water resources within the Upper Potomac River District, as discussed in the 1934 report. The act defines the boundaries of the district and delegates to the Commission certain powers and privileges, and provides for the government of the District by the Commission.

The Commission is authorized to acquire by purchase or condemnation lands, structures, or buildings, or any stream bed, water way, road way, rights of way, watershed or water rights within the District, for the construction, expansion, or maintenance of any dam, reservoir, or appurtenances thereof; to provide for the construction, maintenance, and operation of structures, buildings, dams, impounding reservoirs, and appurtenances; to provide for the regulation of the flow of water within the district and its tributaries; to provide for the levy of taxes by the County Commissioners of Allegany County for the operation, maintenance, regulation, and control of works purchased, acquired, or constructed under the provisions of this Act; to authorize the County Commissioners of Allegany County to submit to the voters of said County the advisability of making a capital expenditure of not exceeding $200,000 in furthering the purposes of this Act, and, in case of a favorable vote thereon, to borrow or sell bonds up to that amount and turn the proceeds thereof over to the Upper Potomac River Commission; to secure benefits of an Act of the Congress of the United States of America approved June 16, 1933, known as the National Industrial Recovery Act, and any Acts amendatory thereof, and any Acts supplemental thereto and revisions thereof, and any further Act or Acts of the Congress of the United States of America to encourage public works, to reduce unemployment and thereby to assist in the National Recovery and to promote the public welfare, or to regulate the flow of navigable or other streams, to conserve water resources and to provide for the penalties for violation of the provisions of this Act.

The Commission is composed of 3 members; 1 appointed by the County Commissioners of Garrett County, and 1 by the County Commissioners of Allegany County, and the 3rd named by the Governor.

The territory included within Allegany County and Election District No. 4 of Garrett County constitutes the Upper Potomac River District for the purposes of the Act.—*Annual Report of the Bureau of Sanitary Engineering of the Maryland State Board of Health—Year 1935.*

History of Typhus Fever in Louisiana*

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THE destruction wrought by epidemics of typhus in past centuries is familiar to everyone. Wherever there has been concentration of the population in close quarters, this pestilence has been rampant. It has devastated armies, jails, immigrant and slave ships, and the population of large cities, especially in times of famine. The various names given to this plague suggest its epidemiology, *e.g.*, famine fever, jail distemper, ship fever, and putrid fever. Other synonyms have been given according to the appearance of the exanthema, as the German Fleckfieber (spotted fever); flea bite fever (because of the similarity of the eruption to flea bites); the Spanish called it Tabardillo; the Italians, Petecchii; and the French, La Pourpé. The word typhus comes from the Greek, meaning stupor.

Vaughan (1915) points out that Hippocrates describes a case very suggestive of typhus but it was not accurately distinguished until the 16th century when Fracastor and also Cardan differentiated it from plague. Typhoid was not differentiated until 1837, by Gerhard, a Philadelphia physician. Vaughan also states that during the 16th century, typhus was so prevalent in the jails of England that it spread among court officers when the prisoners were brought before them for trial. This happened repeatedly and gave the designation of "black assizes" to the court session. The great plague of London (1665), according to this author, was preceded, accompanied, and followed by typhus. At this time the most eminent medical men confused typhus and plague. Typhus fever was apparently introduced into Mexico at the time of the Conquest (1530), and has been endemic there ever since. It was not until 1909 that Nicolle demonstrated that the disease could be transmitted by body lice from monkey to monkey, and this laid the foundation for prophylaxis and control of the infection. The etiology of the disease is still uncertain, but it is generally conceded to be due to *Rickettsia prowazeki* described by Da Rocha Lima in 1916.

TYPHUS IN AMERICA

Kantor (1915) points out that the United States is exposed to infection with typhus on 3 sides, from Asia, from Europe and Africa, and from Mexico. Probably a few scattered epidemics have been introduced from Mexico as, for example, among the New Mexico Indians and in New Orleans from the disbanded troops, but the great majority of cases had their origin in im-

* Presented before the New Orleans Acadamy of Sciences, March 15, 1935, as part of a symposium of the History of Some Important Tropical Diseases in Louisiana.

migrant boats from Europe. Previous to the Civil War typhus was prevalent in all the leading seaport towns of the United States, but is generally considered not to have become endemic. According to Vaughan (1915) the records of the Civil War report 1,723 cases with 572 deaths, but he questions the diagnosis. No cases were reported by Confederate officers.

EPIDEMIC TYPHUS IN LOUISIANA

Data on typhus in early Louisiana is surprisingly scanty. In a diary kept by Dr. McGuire at Monroe, La., from 1818 to 1852 (a typewritten copy is in the Howard Memorial Library), there are a number of entries in the years 1819, 1827, 1832, and 1851, referring to typhus or typhus-like fevers. The syndrome is not described and, owing to the inland location of this town, it is improbable that he was dealing with true typhus. Heustis (1817), an army surgeon, in his *Physical Observations and Medical Tracts and Researches on the Topography and Diseases of Louisiana* makes no reference to epidemics which are recognizable as typhus.

The reports of the Board of Administrators of the Charity Hospital at New Orleans for the year 1832 lists 29 admissions with 17 deaths from typhus fever and 4 additional cases with 4 deaths from congestive typhus fever. Since Gerhard did not differentiate typhoid until 1837, one must accept these records with reservations. The reports for 1843 give 9 cases of typhus, for the year 1844, 4 more, 3 of which were fatal. In 1847 the first real epidemic was recognized when 1,045 cases out of a total of 11,945 admissions occurred. For 6 consecutive years, an average of over 1,200 cases were diagnosed annually in this hospital. Table I shows the monthly distribution of cases or deaths from typhus in the Charity Hospital (1843–1852).

The distribution by months suggests that the infection was introduced in February, 1847, failed to become endemic, but that new cases were imported in October of that year. This epidemic then persisted for 6 or 7 years, during which time typhus might be considered to have become endemic, although new cases may have been frequently introduced.

The *Report of the Board of Administrators of the Charity Hospital* for the years 1848 and 1849 states:

> Cases of smallpox and ship fever must be expected to occur more frequently year by year; the admission of them into the hos-

TABLE I

TYPHUS FEVER IN CHARITY HOSPITAL, NEW ORLEANS, LA.

Year	Total Admiss.	*No. of Cases* Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1843	5,013	...	...	...	...	...	3	6	...	...	...	...	...	9
1844	5,846	...	4	...	...	...	...	...	...	...	...	...	...	4
1847	11,890	0	2	4	107	165	369	57	1	0	4	100	236	1,045
1848	11,945	520	588	267	169	117	28	23	11	9	56	64	30	1,882*
1849	15,558	79	127	193	140	128	65	43	44	49	21	23	58	970

Year	Total Admiss.	*Deaths* Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	
1850	18,676	?	?	?	?	?	18	9	5	13	9	15	?	149	1,043†
1851		42	42	43	61	25	9	11	9	22	23	19	16	322	1,305†
1852		13	31	27	(Other months not available)									150	1,009†

* Typhus-typhoid
† Total cases
(Compiled from the *Reports of the Board of Administrators*, from the *Annual Reports of the State Board of Health* and from the *New Orleans Medical & Surgical Journal*)

pital endangers many valuable lives of the officers, physicians, nurses, and attendants, besides those of the patients, among whom an epidemic may be engendered. It is most earnestly and respectfully recommended to the Legislature to make provision against this evil.

It was suggested that the state take over the Franklin Infirmary so as to provide adequate care for typhus patients and thus segregate them from the Charity Hospital patients.

In the early volumes of the *New Orleans Medical and Surgical Journal,* under editorials written on the health and mortality of the city, appear a few casual references to typhus. It is difficult to understand this lack of interest in a disease which accounted for more than 8 per cent of all the admissions to Charity Hospital during this time, unless it can be explained by the attention focused upon the epidemics of yellow fever and cholera raging at the time, yellow fever causing 2,306 deaths in 1847, and 7,849 in 1853, while cholera caused 924 in 1848, 2,081 in 1849, 1,080 in 1852, and 554 in 1853. Thus in January, 1845, the editor writes:

In the hospital there have been a few cases of typhus fever in persons recently arrived by sea, and from the country, but as far as we know, none have originated in the city.

In July, 1847, the editor refers to inmates of the Charity Hospital having contracted ship fever while in the institution. Four employees of the hospital were sick, on the service of Dr. T. M. Logan, with ship fever and 1 died. An editorial in March, 1852, states:

Typhus fever still prevails in the large hospitals and but for the constant accessions to that disease from abroad, we feel convinced that the fever could do us but little harm, and would excite less attention.

Again in May, 1853, the Journal remarks:

Our mortality from fever has been uncommonly small, chiefly attributable, perhaps, to the fact that very little ship fever has been brought in by the emigrants from Europe.

TABLE II

TYPHUS IN NEW ORLEANS AND IN THE CHARITY HOSPITAL

	Charity Hospital				*Charity Hospital*		
Year	*No. of Cases*	*No. of Deaths*	*New Orleans Deaths*	*Year*	*No. of Cases*	*No. of Deaths*	*New Orleans Deaths*
1832	29	17	..	1868	0	..	5
	Congestive typhus			1869	1	1	5
	4	4	..	1870	1	1	13
1843	9	..	..	1871	0	..	4
1844	4	3	3	1872	0	..	4
1845	0	..	5	1873	0	..	5
1846	0	..	..	1874	0	..	2
1847	1,045	?	154	1875	0	..	2
1848	1,882	344	372	1876	0	..	..
1849	970	224	164	1877	0	..	1
1850	1,043	149	199	1878	..	..	23
1851	1,305	278	228	1879	0	..	2
1852	1,009	150	..	1880	0	..	1
1853	213	59	103	1881	0	..	0
1854	51	18	..	1882	0	..	..
1855	44	29	46	1883	0	..	0
1856	27	11	22	1884	0	..	3
1857	4	2	8	1885	0	..	1
1858	6	5	20	1886	0	..	1
1859	22	10	7				
1860	3	0	10				
1861	1	1	5	1929	2	0	
1863	No record		9	1930	1	0	
1864	0	..	11	1931	1	0	Endemic
1865	..	..	5	1932	9	1	typhus
1866	..	..	12	1933	3	0	
1867	0	..	23	1934	4	0	

TABLE III

MORTUARY REPORTS (INTERMENTS)—STATE BOARD OF HEALTH

Year	*Jan.*	*Feb.*	*Mar.*	*Apr.*	*May*	*June*	*July*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*	*Total*
1855	..	..	..	..	4	5	14	3	8	3	1	2	46
1856	1	2	2	1	3	1	3	3	1	2	2	0	21
1857	1	1	1	0	0	0	0	1	0	0	1	1	6
1858	4	0	0	1	1	1	0	3	2	6	1	1	20
1859	0	0	1	0	0	1	0	0	2	1	2	0	7
1867	..	..	..	..	..	..	..	1	4	2	2	3	12 (5 mos.)
1869	0	0	0	0	0	1	0	3	0	1	0	0	5
1870	0	1	1	3	0	1	0	3	2	2	0	0	13
1871	0	1	0	0	1	0	0	1	0	0	1	0	4
1872	0	0	1	0	0	0	0	1	0	0	0	2	4

Axson, President of the State Board of Health, in his report for 1859, writes:

It will be remembered that the institution of quarantine was resorted to as part only of a system of preventive measures by which it was ardently hoped the scourge of yellow fever, together with ship fever and cholera, might be excluded from our state. The ravages occasioned not only in our city but throughout the length and breadth of the state by the introduction of the famine fever, more popularly known as the ship fever, of 1847, and of cholera, of 1848, through the instrumentality of the perishing population of Ireland, France and Germany fleeing from the disaster of famine and its invariable attendant, pestilence, were sorely felt in those years. . . .

Ship typhus fever in New Orleans was derived from the European emigrants, especially those from Ireland, who are miserably poor and dirty and arrive with typhus generated on the voyage. On the 11th of February (1848?) 500 cases of ship fever were in the crowded wards of the Charity Hospital. . . . Our city during that and succeeding years was the great thoroughfare of disbanded Mexican soldiers, returning here, worn in health and body and mind; many of them bringing in their persons the infection of the dreaded *vomito* among the other maladies which consumed their life or impaired their health.

Table II presents a summary of available statistics on typhus in New Orleans and in the Charity Hospital compiled from the *Reports of the Board of Administrators of Charity Hospital* and from the *Reports of the Board of Health of the State of Louisiana.*

As a supplement to Table I we may now examine the mortuary records of the City of New Orleans as available in the *Annual Reports of the State Board of Health.* This is contained in Table III.

Jones, President of the State Board of Health, presents a summary from the *Report of the Board of Health of the State of Louisiana* for the year 1883 which is reported in Table IV.

Jones, in commenting on these statistics, says:

Surely, this is a remarkable fact. Truly the prevalence of typhus fever during the 18 years preceding our Civil War, and almost total absence in the 16 years following the great civil convulsion, can be referred to well known causes. First, typhus fever was imported into New Orleans by means of the emigrant ships which bore to these hospitable shores the fever and famine stricken and oppressed inhabitants of Ireland. Previous

TABLE IV

TOTAL NO. OF CASES AND DEATHS FROM TYPHUS IN CHARITY HOSPITAL AND IN NEW ORLEANS DURING A PERIOD OF 34 YEARS

	Period Preceding Civil War 1844–1860		*Period Following Civil War 1864–1880*		*Total for 34 Years*		
	Cases	*Deaths*	*Cases*	*Deaths*	*Cases*	*Deaths*	*Per Cent*
Charity Hospital	7,220	1,301	2	2	7,222	1,303	18
New Orleans	....	1,320	..	102	....	1,422	

to the year 1847, typhus fever does not appear to have made any serious lodgment in the City of New Orleans, although it has been committing ravages in Europe for centuries before.

The disease introduced in 1847, both from Mexico (by the United States troops) and from Europe from the fever stricken and starving districts of Ireland, raged as an epidemic in this city for several years.

The same author points out that although nearly 1,500 inhabitants of New Orleans died of typhus, the disease was confined chiefly to the poor and ill fed, as the majority of the deaths occurred in the wards of the Charity Hospital. He stresses the fact that quarantine is essential to the protection of New Orleans from the introduction of typhus fever and that these measures must be perpetual. He believes that typhus introduced into New Orleans tends gradually to become extinct, due to the better food, better living or ventilation of the mass of the inhabitants. He attributes the improvement in the health of the population partially to the building of an extensive street railroad system which has scattered the dwellings, thus preventing overcrowding.

DISCUSSION

It is unfortunate that no data is available upon typhus fever in Louisiana previous to 1843, with the exception of the *Report of the Board of Administrators of Charity Hospital* for 1832. This latter record is undoubtedly open to question. It is almost inconceivable that typhus was not introduced into New Orleans earlier than this date, when epidemics were so frequent in Europe. The source of the earliest cases in New Orleans has been rightly attributed to immigrant boats from Europe and to the disbanded United States soldiers returning from Mexico. It is very surprising that typhus, once introduced into this city, did not spread throughout the state, but no records of this occurrence exist, with the possible exception of the diary of Dr. McGuire, referred to above. With the introduction of epidemic typhus to New Orleans in 1847, it remained endemic at least through the year 1852, and more or less continuously through 1856, if one judges from the mortuary reports of the City of New Orleans. Following this the infection was sporadic. With the blockade of the city during the Civil War the disease probably disappeared only to be reintroduced upon the occupation by the federal troops in 1862. When foreign trade was resumed a few new cases were admitted, but no epidemic was engendered. Thus throughout the late 60's, 70's and early 80's, we find annually a few deaths from typhus in New Orleans. The writer is unable to explain the almost complete absence of reports of cases from the Charity Hospital records for this period.

Dyer (1933), in discussing typhus, states:

> On its introduction into New Orleans in 1847, the disease was limited to the immigrants themselves and to the doctors and nurses caring for them. This lack of spread of the disease in New Orleans is most readily explainable by the scarcity or absence of body lice in our southern lowlands.

The abundance of lice during these early days is a matter upon which the writer is unable to find any information, but certainly these ectoparasites are not absent today.

One of the peculiarities of the racial distribution of this infection is pointed out by Hoffman, who found that of 502 deaths occurring between 1849 and 1885, only 25 were among the colored. The records of case admissions to the Charity Hospital also speak for the low rate among Negroes.

ENDEMIC TYPHUS IN LOUISIANA

While endemic typhus (Brill's disease?) has been recognized for years in certain southern states, the first case

was reported from Louisiana in 1929 (Rucker). Since then 46 cases have been diagnosed. According to Badger (1934) this is essentially an urban disease with the greatest incidence in the seaports and having a tendency to spread inland along lines of communication. Maxcy (1926) pointed out that epidemiological evidence was against louse transmission and suggested that a reservoir exists other than in man—probably in rodents—from which the disease is occasionally transmitted to man. This has been substantiated by the researches of the U. S. Public Health Service, notably Dyer, Rumreich, Badger and Ceder. Strains of typhus have been isolated from rats in various localities and rat fleas have been found naturally and experimentally infected. Shelmire and Dove (1931) believe that the tropical rat mite, *Liponyssus bacoti*, was responsible for transmission of the infection in Texas.

Two other theories of the epidemiology of Brill's disease should be mentioned. Kantor (1915) suggested that the infection might result from the introduction into this country (upon immune carriers) of lice harboring attenuated typhus organisms. Zinsser (1934), in studying the nativity of victims of Brill's disease in New York and Boston, found that out of 502 cases, 93.6 per cent were born in endemic typhus regions of Europe, and 80 per cent in Russia alone. He concludes that the only assumption compatible with the data is that cases of Brill's disease which have occurred in New York and Boston are recrudescences of typhus fever acquired at an earlier time in endemic typhus foci in Europe. He maintains that Brill's disease is an imported form of the classical European typhus fever. According to this author, the endemic typhus of the northeastern states is distinct from that of southern United States, the latter resembling tabardillo of Mexico.

With these opposing views in mind, the writer studied the histories of 17 cases occurring in Charity Hospital, and the epidemiological reports of the State Board of Health (46 cases). Table V shows the distribution by years and parishes of endemic typhus in Louisiana. The greatest number of cases occur in the rice growing district of the state. With the exception of Orleans Parish, the disease is practically confined to this region. The epidemiological significance of this remains unknown, but might suggest association with rats.

Table VI presents a summary of 17 cases occurring in the Charity Hospital at New Orleans. All of these were white persons and only 3 were females. Twelve were from Orleans Parish. The occupation gives no clue to the epi-

TABLE V

EPIDEMIOLOGY REPORTS OF TYPHUS FEVER

(LOUISIANA STATE BOARD OF HEALTH)

Year	*Cases*	*Distribution by Parishes*	*Deaths*	*Total by Parishes*	
1929	1	Orleans 1	0	Orleans	13
1930	0			Calcasieu	23
1931	1	Rapides 1	0	Caddo	2
1932	17	Orleans 5, Calcasieu 7, Caddo 1, Washington 2, Jeff. Davis 1, Lafayette 1	1	Washington Rapides Jeff. Davis	3 1 1
1933	11	Orleans 4, Calcasieu 6, Washington 1	1	Lafayette Jackson	1 1
1934	16	Orleans 3, Calcasieu 10, Caddo 1, Jackson 1, St. John 1	1	St. John	1
					46

TABLE VI

TYPHUS FEVER IN CHARITY HOSPITAL, NEW ORLEANS

No.	Color Sex Age	Occupation	Month	Parish	No. Days Fever: In Hospital	No. Days Fever: Before Admission	Highest Temp.	Exanthema	Weil-Felix	Total WBC
1	WM 25	Laborer	May	Jefferson	5	10	103.4	+	+	11,250
2	WM 31	Machinist	Dec.	Orleans	15	5	103.5	+	+	13,500
3	WM 22	Grocery clk.	Sept.	Orleans	11	7	104.0	+	+	9,500
4	WF 33	Housekeeper	Jan.	Orleans	13	10	103.4	+	+	10,750
5	WM 20	None	June	Orleans	7	7	104.4	+	+	11,100
6	WM 29	Laborer	Aug.	Orleans	8	14	103.8	+	+	6,600
7	WF 30	Nurse	Aug.	Orleans	11	3	104.0	+	+	5,600
8	WM 13	Schoolboy	Aug.	Orleans	10	10	104.5	+	+	5,400
9	WM 47	Painter	Aug.	Lafayette	13	10	103.2	+	+	9,000
10	WM 48	Bricklayer	Sept.	Washington	7	14	100.3	+	+	16,000
11	WM 32	Salesman	Jan.	Orleans	7	7	103.0	+	+	9,000
12	WM 45	Laborer	Dec.	Terrebonne	18	14	104.0	+	+	7,700
13	WM 40	Salesman	Oct.	Orleans	7	7	103.0	—	—	13,250
14	WM 23	Clerk	Jan.	Orleans	7	2	104.0	+	+	5,000
15	WF 24	Housekeeper	Mar.	LaFourche	16	..	104.4	+	+	4,000
16	WM 29	Clerk	Aug.	Orleans	13	16	103.2	+	—	5,800
17	WM 58	None	Sept.	Orleans	10	6	103.0	+	—	7,500

demiology. One case (No. 13) is of doubtful diagnosis. There were no fatalities. Practically all gave a history of fever for several days previous to admission, and progress notes indicate that some of them were not acutely ill. It is quite probable that there are many cases throughout the state which go undiagnosed. The Weil-Felix reaction was positive in all but 3 cases, but frequently was not positive until several days after admission. The monthly distribution did not appear significant. Through the courtesy of the State Board of Health, the writer was able to examine the histories of approximately 30 cases. The occupation of these patients gave no clues except the possible association of some with rats through the rice industry. There was no indication that imported Mexican laborers or other nationalities were responsible for the outbreak of the disease.

DISCUSSION

Endemic typhus was not recognized in Louisiana until 1929, but since that time 46 cases have been diagnosed. While 3 deaths have occurred, many of the cases might be regarded as rather mild and thus, unless the exanthem is observed by the physician the diagnosis would be difficult. No information exists as to the method of transmission, but the geographical distribution suggests possible contact with rats. Whether the rat flea or the rat mite is responsible remains unknown. Certainly the data from Louisiana lend no support to the theory of Kantor (1915) and would indicate that southern endemic typhus must be separated from the Brill's disease of Boston and New York, since none of these cases had contact with Old World typhus.

SUMMARY

Epidemic typhus apparently made its first serious inroads upon the population of New Orleans in 1847 and remained endemic for at least the next 6 years. The pestilence was introduced by immigrant boats from Europe (chiefly Ireland) and probably also by disbanded soldiers from Mexico. That the disease failed to penetrate inland is difficult to explain. It seems to have been confined chiefly to the poorer classes, although hospital attendants contracted it. For the 15 years following the Civil War, only 102 deaths occurred in New Orleans from typhus

in contrast to 1,301 deaths in the 19 years preceding the war. Endemic typhus was first recognized in Louisiana in 1929, and since then, 46 cases with 3 deaths, have been reported in the epidemiological statistics of the State Board of Health. These cases were chiefly from 2 parishes, Calcasieu and Orleans.

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Promotion of Human Health

THOUGH nature is sensational in her results, she is not sensational in her processes. In preventive medicine we seek to understand the moves which lead up to dramatic events, but the processes are far from dramatic. In the promotion of human health we gain little or nothing by the treatment of disease, for at the best this is merely a palliative. It can never be very successful even in its avowed object of restoring health to those who have lost it, because what we call disease is in reality not disease itself, but its end product. This does not refer to those acute diseases which are self-limited reactions. Here, improvements in treatment will do much to keep them within the bounds of physiology, so that they neither kill nor permanently damage us. But for those diseases which are not self-limited, for the results of long continued adverse factors which produce structural alterations of a permanent character, or which call for mechanical interference to preserve life, the future can give us little more than the past.—Dunstan Brewer, D.P.H., *Ann. Rep., Medical Officer of Health for the Year 1935*, Borough of Swindon, p. 7.

The Rural Health Conservation Contest as a Factor in Rural Health Development

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THE first whole-time county health department was established in 1908. Since that time the county or health district plan has come to be recognized as the most suitable method of organization for health administration in rural areas. This type of rural health administration has gradually developed until there are today approximately 540 whole-time county or district health units in this country.

In spite of the fact that during the past quarter of a century there has been definite progress in rural health work, at the present time less than one-quarter of the rural population is served by full-time local health units. Also on the discouraging side of the picture is the fact that many of these full-time units are not adequately staffed and financed to carry on even a reasonably comprehensive public health program. A considerable number of counties that were originally organized as so-called three piece units (that is, units with a full-time health officer, a public health nurse, and a sanitary inspector), still remain three piece units today. While it is encouraging to observe how well the basic principle of a county or a district as the unit for rural health administration is being accepted, it is discouraging to find so few rural health units which have gone beyond the establishment of the very minimum requirements essential for health services.

Lack of financial support is an obvious and often valid reason for failure to develop beyond the point of minimum staff. It likewise seems certain that in many rural areas most of the people have no understanding of the need or value of more adequate health services. Further development of rural public health work in this country would seem to depend upon recognition and furtherance of two essential principles:

1. That state and federal financial aid is essential for many county or rural districts.
2. That our rural areas need enlightenment on public health requirements and values.

The development of more adequate rural public health services is of vital concern to the people of the United States. This is indicated by the fact that rural death rates in general exceed urban rates, notwithstanding the natural advantages of country life.

The need for greater development of rural health work, together with the success of the City Health Conservation Contest as a precedent, led to the inauguration of the first Rural Health Contest in 1934. The Chamber of Commerce of the United States and the

American Public Health Association sponsored this project, made possible by a grant from the W. K. Kellogg Foundation. The purpose of the Contest is to develop basically sound and more adequate public health services in rural areas.

The first essential step in developing a sound and adequate public health program is to take careful inventory of the community's present facilities and needs. All counties participating in the Rural Health Contest appraise their health activities by preparing a Fact-Finding Schedule which covers minimum basic essential health services. While participation in the Rural Contest is of assistance to all rural health units, it is particularly beneficial to those units in which public opinion has not as yet been sufficiently aroused to make the most effective use of its present health facilities or to seek more adequate services. In preparation of the Fact-Finding Schedule the activities of all groups and organizations are taken into consideration. By this method the attention of local groups is effectively focused upon:

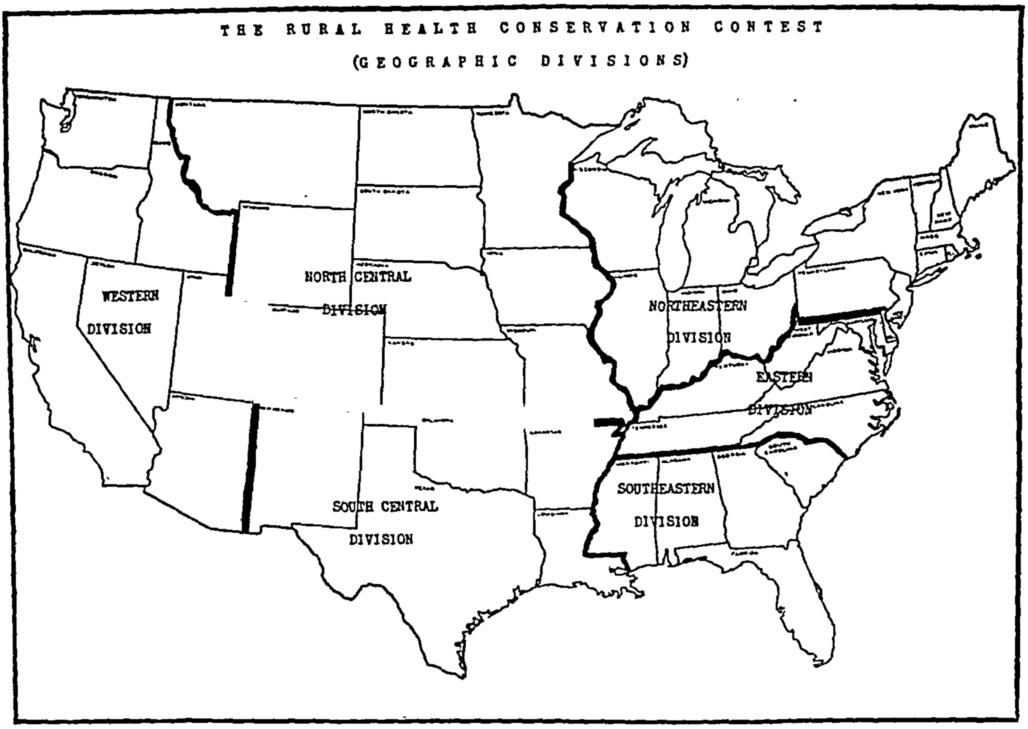
1. The need for effective coördination of the specific health activities which are known to form the basis of the local program.
2. The development of those community resources which have not been effectively and fully utilized, or which have not adequately been brought to light.

The Fact-Finding Schedule when completely filled out presents a report of the community's entire public health program. These reports are submitted to a Grading Committee on or before March 15 of each year and are carefully studied and analyzed. A detailed analysis of each Fact-Finding Schedule is forwarded to each participating community.

In the compilation and consideration of activities as they affect the broad public health program, the need for effective coördination becomes apparent. In addition to activities undertaken as specific health projects, there are in every community groups of individuals who have no connection with health organizations but whose effect upon the community public health can and ought to be of tremendous value. The importance of making the most effective use of such groups as private physicians, dentists, nurses, teachers, nutritionists, parents, ministers, and newspaper editors cannot be overemphasized. A truly comprehensive public health program will never be reached without giving such groups the opportunity of fully participating in the program. For successful participation in the Contest, and therefore for the successful development of a well-balanced, comprehensive public health program, every county or district health officer should consider whether or not he has given these groups the opportunity of developing their potentialities in promoting public health. It is such a community public health program, carefully planned so as to make the most effective use of all the community's resources, including these all important groups, that the Rural Contest seeks to stimulate and encourage.

Although the competitive aspect of the Contest unquestionably tends to stimulate and sustain interest, it is primarily a project designed to encourage the development of sound rural public health work. Full-time field service is provided to contact state and county district health units in the furtherance of this objective. State departments of health have been uniformly enthusiastic and coöperative.

During the first year of the Contest, all counties or districts having full-time health service with local chambers of commerce or similar business organizations affiliated with the Chamber of Commerce of the United States were eligible for participation. Of the



present 540 full-time county or district health units in the United States, only 200 were eligible by virtue of having local business organizations affiliated with the National Chamber. Of these, over one-half, 105, enrolled, and 69, or 65.7 per cent, submitted schedules for grading.

During the second year of the Contest the basis of eligibility was changed to permit a full-time district or county health unit which did not have a chamber of commerce affiliated with the National Chamber, to be sponsored by a local chamber of commerce in an adjoining or neighboring county. This year, the eligibility requirements were broadened still further, to permit full-time units without any suitable local business organization, to enter the contest through direct enrollment with the American Public Health Association, provided a representative public health committee is appointed to sponsor the Contest. All full-time rural health units are now afforded the benefits of participation. Entries in the second year's Contest includes 160 units. Unlike the City Contest which is conducted for various population groups, the rural competition is carried on in 6 geographic divisions of the country. Each county or district health unit competes only with other health units in its own geographic area.

The map indicates the geographic division of the country for purposes of the Rural Contest.

The winning unit in each geographic area is awarded a bronze plaque and certificates of honorable mention are presented to the higher ranking counties.

An article on county health department expenditures and personnel will be published in a subsequent issue of the *Journal*.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

PULMONARY TUBERCULOSIS DUE TO BOVINE TUBERCLE BACILLI

FROM time to time we have published editorials on the transmission of bovine tuberculosis to human beings. That such infection takes place was definitely proved at the University of Pennsylvania in 1902. The reports of the British Royal Commission and of the German Imperial Commission amply confirmed the findings, and since that time no one has seriously questioned the danger to human beings, especially children, of tuberculosis in cattle. The vehicle of transmission is, in the vast majority of cases, milk. We have more or less complacently accepted the fact that the bovine type of organism is transmissible to human beings, and that it is prone to produce lesions of the glands and bones, but not the pulmonary disease known generally as consumption. There have been many articles arguing for the relative unimportance of bovine infection, and the National Tuberculosis Association decided not to engage in that phase of the tuberculosis problem.

Our complacency in this regard has been considerably ruffled by the reports of pulmonary tuberculosis due to the bovine organism. From February, 1931, to July, 1933, the State Serum Institute of Copenhagen found the bovine type of organism in 26 patients suffering from pulmonary tuberculosis. During approximately the same period, the bovine type was found in 39 specimens of pus from the cervical glands, in the cerebral spinal fluid, and urine taken from the residents of Copenhagen. All of these patients were under 32 years of age and 10 under 5. In only one case was open tuberculosis found in another occupant of the patient's home. The writers of the report state that, so far from pulmonary tuberculosis due to the bovine type being rare, it is, as a matter of fact, extremely common.[1]

In Amsterdam,[2] in an examination of 115 adults suffering from pulmonary

tuberculosis, 3 gave the bovine organism, and in the province of North Holland, 10 out of 89 such cases also gave the bovine organism. Gastric lavage of 110 children yielded the bovine organism in 9. Examination of material from other forms of tuberculosis gave 55 human type and 11 bovine, but this latter finding is not pertinent to the present discussion. Griffith and Smith,[3] on the basis of extensive investigation in the north-east and southern counties of Scotland, make the statement that pulmonary tuberculosis is frequently caused by the bovine type of organism. From April, 1934, to December, 1935, these authors investigated 103 cases of pulmonary tuberculosis, in 13 of which the bovine type of organism was cultivated from the sputum. In 5 of these, there was a history of previous glandular tuberculosis so that the channel of entry was almost certainly the alimentary canal.

America appears to have fallen behind in this investigation. As far as we are aware, there is no laboratory in the United States doing systematic typing of cases of pulmonary tuberculosis. It is a tedious and expensive piece of work which can be undertaken only by well financed organizations, but that should be no bar to the investigation. It is not too much to say that we have no idea at the present time how many cases of pulmonary tuberculosis are occurring from infection with the bovine type of bacillus. We believe that we are in a better position as regards bovine tuberculosis than other countries, due to the activities of our Bureau of Animal Industry, but this does not excuse our lack of interest and activity in regard to the particular question under discussion.

Very recently the editor has been repeatedly urged to take the matter up and do all within his power to bring about such studies as are being made in England and some of the Scandinavian countries. This is due to a situation in some of our states so serious as to excite apprehension.

As an actual fact, we do not know what is going on, and this of itself is sufficient reason for undertaking the study.

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TRAINING OF PROTOZOOLOGISTS

THE training of medical protozoölogists in the United States in the past, with few exceptions, has been neglected.

The recent epidemic of amebic dysentery in Chicago, endemic malaria in the South, the frequent occurrence of trichomonas and trypanosomes in man and animals, and other tropical and semi-tropical protozoal diseases of man and animals necessitate well trained medical protozoölogists, who not only will be able to diagnose and teach, but who also will be engaged actively in research in advancing this branch of science.

Why has the training of protozoölogists in the past been so neglected?—In many of the American universities there is not a single professorial chair in medical protozoölogy. Most medical students acquire superficial and hurried information and occasionally a few demonstrations of pathogenic protozoa in the departments of bacteriology, public health, or clinical medicine.

The divisions of protozoölogy in departments of zoölogy of our universities, on the other hand, deliberately omit medical protozoölogy because of lack of proper facilities and knowledge of aseptic technic and experimental immunology.

Method of training of medical protozoölogists—The introduction of a brief, compact, and well thought out course of medical protozoölogy, preferably in some department of a medical school with daily instruction of from 4 to 8 weeks, probably will be sufficient to cover the subject. The requirements of entrance for such a course, however, should be high, and no student without knowledge of bacteriology, immunology, and histology should be permitted to take the course.

The departments of bacteriology, public health, clinical medicine, or tropical medicine could readily organize such courses, if necessary, by adding a trained protozoölogist to their staff.

The object of the course should be:

1. To give all necessary training to properly qualified students in the form of lectures, demonstrations, and actual laboratory work. The training should be general and should include representatives of all protozoal diseases of man, supplemented with protozoal diseases of animals. Students should also receive sufficient training to be able to identify non-pathogenic protozoa. Special stress should be placed on the etiology, epidemiology, pathology, symptomatology, diagnosis, prognosis, prophylaxis and treatment of protozoal diseases, and the morphological, cultural, and immunological relationship of the different species of protozoa.
2. To broaden the average student's conception of the many forms of protozoa and their activities.
3. To train for original research either under supervision or independently.
4. To train to teach courses of medical protozoölogy and to supervise research when appropriations go into these enterprises.

The teaching of medical protozoölogy has become a burden of the departments of bacteriology, public health, and immunology. The universities that were fortunate in having men in these departments interested actively in protozoölogy, as a rule gave effective training to medical students.

At the University of Michigan, Professor F. G. Novy, as early as 1903, introduced brief and effective lectures on protozoölogy to medical students in the class of bacteriology and intensive training and research to a few graduate students. He continued this until 1934, the last year of his active teaching.

It is hoped that the time is not far distant when in some of our best medical schools chairs or departments of medical protozoölogy will be established.

At present, specific training and information in medical protozoölogy may be obtained, among others, from the following institutions: Harvard University, Department of Tropical Medicine and Department of Comparative Pathology; University of Chicago, Department of Bacteriology and Hygiene; Johns Hopkins University, School of Hygiene and Public Health; Tulane University, Department of Tropical Medicine; Vanderbilt University; University of Michigan; University of California; U. S. Army Medical School; U. S. Naval Medical School; and the National Institute of Health, U. S. Public Health Service.

Medical protozoölogy is a broad subject, indeed, and many of its fields have not been explored as yet. With careful training of more protozoölogists, and with sufficient appropriations for research, this branch of science is bound to grow. Its future is rich with the allurement of interest and in possible benefit to mankind.

SIXTY-FIFTH ANNUAL MEETING AMERICAN PUBLIC HEALTH ASSOCIATION

IT is no empty formality nor specious courtesy to say that the meeting in New Orleans will go down as one of the best we have ever held. The registration has exceeded our expectations—nearly 1700. The welcome has been as warm as the weather. Both state and city officials have exerted themselves to show every courtesy possible, and the well known hospitality of this charming old city has come to its finest flower in welcoming the American Public Health Association and its guests.

New Orleans has a model Auditorium, ample for all possible demands. There are several halls for large meetings, and an abundance of committee rooms for smaller groups. There is abundant space for the largest possible number of exhibits which can be collected, with good lighting and acoustics.

The first general session was held in the huge Concert Hall of the Auditorium. We were welcomed by both state and city officials in the most delightful terms, so much so that everyone desired to accept the invitation of the state officer of health to remain until we went broke.

At this meeting Dr. Thomas Parran, Surgeon General of the U. S. Public Health Service, was installed as President, taking over the office held by Dr. Walter Brown. His address was received with deserved enthusiasm, and our readers have it before them in the present issue of the *Journal.*

In the absence of the chairman of the Sedgwick Memorial Committee, the President announced the award of the medal for 1936 to General Frederick F. Russell. This will be given further notice in another column.

Of the many delightful features which have marked the meeting, perhaps none is more noteworthy than the dinner on Tuesday night inaugurated by the Southern Branch of our Association, who invited the Western Branch to participate. This we hope is the inauguration of a most delightful custom. Certainly everyone appreciated it. More than 200 attended. The address of the evening was given by Dr. Allen W. Freeman, Dean of the School of Public Health of Johns Hopkins University, who very gracefully took the occasion to commemorate the services of southern men in the public health movement. We hope that each year will see a repetition of this function.

Space does not permit of a description of all of the functions which have been held by affiliated and associated organizations. Among these were the dinner of the Association of Women in Public Health, the luncheon of Delta Omega, meetings of the Harvard University Alumni, the Yale Alumni, Johns Hopkins Alumni, Massachusetts Institute of Technology Alumni, and the International Society of Medical Health Officers. There were also a number of scientific meetings of associated organizations, such as the American Association of School Physicians, the Association of State Registration Executives, Conference of State Laboratory Directors, Conference of State Sanitary Engineers, National Committee of Health Council Executives, State Directors of Public Health Nursing and Instructors in Public Health Nursing.

Of the constituent nations, Canada gave us the largest delegation. Fourteen members came, and Dr. S. Boucher, the honored Health Officer of Montreal, brought his three charming daughters. Our sister republic on the south was represented by Dr. Angel de La Garza Brito. With the opening of the wonderful

highway between the United States and Mexico City, we are fired with an increased desire to visit that beautiful city and the charming country of which it is the capital.

Cuba was represented by Mr. Carlos Martin and Dr. Domingo F. Ramos.

Among our guests we must mention Dr. Cicely D. Williams, West Africa; Dr. Frank S. Boudreau, League of Nations; Dr. Otto Neurath, Holland; Dr. Charles N. Leach, China; Mrs. Mary K. Cauthorne, Alaska; Dr. Abraham J. Levy, Palestine, and C. F. Blackler, Bermuda.

There were some 41 scientific exhibits, many of which had some feature which in the opinion of the judges was commendable. Certificates of merit were awarded to The American Red Cross, National Society for the Prevention of Blindness, Sewerage and Water Board of New Orleans, and the Committee on Administrative Practice, Health Conservation Contests.

The entertainments provided for the ladies were abundant and arranged by Mrs. Charles F. Buck, Jr., to whom we offer our grateful appreciation. The Ball arranged by the Chairman of the Entertainment Committee, Dr. A. E. Fossier, was delightfully in the spirit of old New Orleans, with its tableaux in carnival costumes, its Negro chorus and Negro street boys. A very large audience assembled and remained until the orchestra played " Good Night, Ladies."

As usual the annual banquet of the Association was a brilliant affair largely attended. The address was given by Dr. Henry E. Sigerist, Johns Hopkins University. Announcement was made of winners in the scientific exhibits.

Altogether the New Orleans meeting will long dwell in the memories of those who were fortunate enough to attend. Our only regret is that owing to our rules made necessary by the great extent of our country, it will be at least 12 years before we can again enjoy the gracious hospitality of this beautiful and historical southern city.

SOME OF THE NEW ORLEANS ANNUAL MEETING PAPERS
TO APPEAR IN DECEMBER JOURNAL ARE:

Immunity to Virus Diseases
Goodpasture

Mental Hygiene in Public Health
Mitchell

Program in Maternal and Child Welfare
Under the Social Security Act
Eliot

The Standardization of Typhoid and
Paratyphoid Vaccines
Feemster, Wetterlow, and *Cianciarulo*

PUBLIC HEALTH EDUCATION*

Institutional Coöperation with the Press—The public relations problems of the hospital, the clinic, the sanatorium in the smaller community rests largely upon the superintendent or other executive as reviewed in "Selling the Small Community Hospital," by J. M. Beeler, M.D., superintendent of Spartanburg (S. C.) General Hospital.

Dr. Beeler discusses the need for community understanding, and how inter-hospital relations with the trustees and the lay auxiliary may be handled to advantage. Particularly important is "Coöperating With the Press."

Usually from our point of view the problem is the newspapers. They usually print much about what we do not want printed and little about the things we desire the public to know. We must remember, however, that we have an entirely different viewpoint. We feel that anything private is not news and the papers feel that everything concerning anyone in the community is news. We should have a common meeting ground and by our trying to understand their viewpoint obtain a better understanding on their part of our problems. I have found that if you are willing to coöperate with the newspapers they will in turn see your situation. They are in position to inform the public of your work, your plans, and to educate the people and establish confidence in what you are trying to accomplish. We must remember that the plans we have and the program we are planning must be news and of interest to our local community. We should remember that . . . when we refuse to take them (newspaper men) into our confidence they are apt to resent our attitude and refuse to coöperate with us. We must also remember that the institution belongs to the community, and the only way they can check on us is through the local papers.

There are certain hospital happenings which are always news and should be given to the press, such as: staff meetings, auxiliary meetings, emergencies, accidents, and illness of prominent people. The hospital may not feel free to discuss certain illnesses and accidents with the papers but the papers should be given the name of the physician and of the patient's family, so that they may obtain further information if the people desire to give it. In other words, coöperate with local papers, they are your mouth piece through which you can educate your community; and remember most papers are working for the same end that you are—the improvement of the community. . . .

In the same issue of *Hospitals*, American Hospital Assn., 18 E. Division St., Chicago, Ill. (Sept., 1936), is "Establishing Friendly Relations." A hospital executive systematically calls briefly upon patients; a friendly follow-up letter is sent to former patients; the business office humanizes the relations; and a hostess meets visitors in the lobby.

What is the result? Our hospital has become boosted widely, indirectly through our efforts, of course, but actually by the unconscious "pushing" of our work by our own ex-patients and their business, social, and family associates. It is the finest sort of publicity and it brings concrete award.

It has often been said, and with reason, that one's experience in a hospital is, for a considerable time afterwards, the most frequent conversational subject. What we have done is to capitalize on this phenomenon, always bearing in mind that the whole process would break down and react unfavorably against us if the "whispering campaign" was ever given a just cause to knock, not boost. . . .

Many public and private health agencies might well take to heart the conclusions of the author:

There is no claim to originality in all this, and to many it may not even be unusual; nevertheless I am convinced that a well con-

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

ceived plan for establishing friendly relationships with our patients, their visitors, the ministers, the contributor, the city administration, the staff, and the community at large will, in more ways than one, pay handsome dividends, and eventually gather a host of friends and boosters for the hospital, the value of which cannot be overestimated.

"A Simple Visual Method of Presenting Pertinent Data from the Hospital's Annual Report," Dr. C. G. Parnell of Rochester General Hospital, emphasizes the need of making annual report statistics easily grasped by "the board of trustees, the medical staff, and others concerned in the progress of the institution."

In order to present in an easily understandable form the salient data from the annual report, we have employed for several years in the Rochester General Hospital a very simple series of diagrammatic charts which at a glance will show the data of the current year in comparison with those of several previous years. The diagrams may be presented in the form of printed charts or on lantern slides, the latter method being preferable for presentation to any large group. The mimeographed charts have been found very useful in dealing with budget committees of the hospital and the Community Chest and with government officials and others responsible for provision for hospitalization of public charges.

The vertical block method is used for the diagrams. Other methods may be employed, but this seems to be the most readily understood and easily grasped. Charted curves are not as appropriate for this type of diagrammatic presentation. . . .

How Honest Can We Be?—Enthusiasm for a "good cause" sometimes brings a strain on ideals of honest dealing with the public. Dr. P. B. Brooks, Deputy State Commissioner of Health says:

Public health propaganda at times reflects something of the tendency, so common and apparent in much of the present-day commercial advertising, to exaggerate, overemphasize, and even distort facts in order to attract attention, make an impression, or carry a point. Sometimes the exaggeration is more or less unconscious and unintentional, the result of excess of enthusiasm. In another case it will be readily admitted and an attempt made to justify it on the ground that it is in a good cause.

Perhaps an attempt is being made to persuade an official body to undertake a certain project "in the interest of public health." The dangers of delay or failure to act are vividly pictured. Only those authorities are quoted and figures cited which are favorable to the project. Are there equally competent authorities who advocate some other procedure or data which suggest that a similar project elsewhere has failed? They are not mentioned. The project may be undertaken and be as successful as its advocates have predicted. On the other hand, enthusiasm is likely ultimately to be dampened by the almost certain discovery that the sponsors have been in some measure misled and action taken under a misapprehension. The project has "gone over" but the reputation of the original advocates will suffer. When they come later with a new project their arguments will be taken "with a grain of salt."

It is said of Abraham Lincoln that, in laying a case before a jury, he began by presenting and discussing all of his opponent's probable arguments. Thus he reduced the effectiveness of his adversary's arguments and created an impression of honesty and fairness. . . .

In *Health News*, State Dept. of Health, Albany, N. Y. Aug. 24, 1936. When are health workers in danger of being dishonest?

"He and She, Not It"—Under this title P. D. Hugon tells how to personalize amateur movies.

Turning every "it" into a "he" or a "she" is, in brief, the dominant idea back of all dramatization—cinematographic, literary, or commercial. In a good photoplay, as in a good novel or a well conceived publicity stunt, there are no pure things or ideas; there are only persons, because it is only through personality that most people are able to reason back to abstractions. This obvious principle is commonly overlooked by highly educated people; hence their scenarios, their books, and their advertising alike tend to be dry and boring. The life story of Pasteur will reach millions who would not look at a text on biology. . . .

Here is a dentist who makes better plates. Will he show on the screen the manufacture and fitting of his dentures to a number of

patients? No! He will tell the story of a woman whose happiness was ruined by ugly or missing teeth (or of a man who was handicapped by the same cause). He will show, by way of contrast, a charming young person unattainable by her suitor because of his physical defect. Then he will briefly remedy the trouble and let the romance or the career bloom to a satisfactory conclusion. That is reducing the situation to an over-simple formula, of course; yet that formula is as basic as fondant to candy making. The flavoring can be varied in a thousand ways, but the foundation always must be substantially the same. . . .

Here is a social agency that wants to induce the mothers of babies to bring them to a free clinic. Mere views of the plant, the nurses, and the doctors may remove certain misunderstandings as to what goes on inside the walls, but these things will have little emotional appeal. Let the simple story be told of an ailing child contrasted with a healthy one, followed through a life of misery or happiness, and every mother in the audience will do the figuring for herself. . . .

In *Movie Makers,* 420 Lexington Ave., New York, Aug., 1936. *25 cents.*

Indirect But Graphic Presentation—Straight argument against a fallacy in many cases is not nearly so telling as a graphic, though indirect refutation.

Under "Vitamin Promotion" in *Journal of American Medical Assn.* (Aug. 22, 1936), we find the following:

. . . A new product is a so-called Vitamin Energy Bar, which is claimed to be the equivalent of 3 loaves of bread in fat, 1 lb. of butter in protein, 2½ lb. of cheese in carbohydrates, 2 bunches of celery in calories, 2 oranges in calcium, 1 large egg in phosphorus, and 4 quarts of buttermilk in iron. Somehow the promoter overlooked vitamins F and H as well as zinc, manganese, and copper. This is a fine example of the fallacy of equivalents as a standard of measurement. Instead of giving the equivalent in fat of the butter, the bread is chosen as the example; instead of giving the equivalent of the milk for calcium, oranges are chosen for that comparison. And the calories are said to equal those of 2 bunches of celery. Whoever picked celery for calories! Actually the "Vitamin Energy Bar" seems to provide ½ oz. of fat, ⅙ oz. of protein, and less than 2 oz. of carbohydrate, with traces of calcium, phosphorus, and iron. Those are the facts—but they do not sound nearly as impressive as the great quantities of food represented by the advertiser's equivalents. If however you really want to see if one "Vitamin Energy Bar" is the equivalent of all that food, eat the "energy bar" at one meal and all the food at another. Your digestive system will solve the problem for you—and not mathematically!

NEW

A new outlet for pictures and other types of graphic material is *Mid-Week Pictorial,* 148 E. 47th St., New York, N. Y. Long published by *New York Times,* now as an independent pictorial it will be developed for a large place in the news weekly field. We hope that some carefully selected photographs and other graphic material will reach the editor. Better first get a copy for *10 cents.*

BOOKS AND REPORTS

Physician, Pastor and Patient: Problems in Pastoral Medicine—*By George W. Jacoby, M.D. New York: Hoeber*, 1936. 390 pp. Price, $3.50.

We have read this book with unusual pleasure, and believe that it is one which can be thoroughly recommended, especially to clergymen. There can be no question that every clergyman should know a good deal of medicine and physiology. Many of them show some interest in the subjects here discussed, but few have the necessary training to appreciate the problems presented.

The author writes entertainingly on the origins of medicine and of religion. Sketches of a number of religions and their effects on patients' faith and the general attitude of the adherents to medicine, are given.

Among the vital problems in which the physician and the clergyman are concerned are birth control, suicide, mismating and divorce, criminality, sex education, feeblemindedness, euthanasia, etc. Concerning divorce and mismating, he makes what seems to us a very strong point, in emphasizing the importance of careful selection in marriage rather than divorce, which he calls the undoing of a wrong. A chapter is given to "Modern Religion in Daily Life," in which what it is doing in medicine, hygiene, and social betterment is discussed. An excellent bibliography is given at the end.

There is nothing new in the book. Its value consists in the collection of a lot of material which is scattered through various journals and books on the special subjects considered here. There are a number of excellent illustrations. The whole book strikes us as being a sane discussion of the problems which affect physicians and clergymen alike, and on which they should get together more than they have done in the past. The printing and make-up are excellent. MAZŸCK P. RAVENEL

Principles and Practice of Recreational Therapy for the Mentally Ill —*By John Eisele Davis, B.A., M.A., in collaboration with Dr. William Rush Dunton, Jr. New York: Barnes*, 1936. 206 pp. Price, $3.00.

This textbook is an important contribution not only to the special field of physical education and recreation but also to educators and many others in public health, hospital, or related rehabilitative service.

The Scientific Book Club of New York includes it on its list of scientific books. It has been copyrighted in England. Dr. Matz, Director of Research of the Veterans' Administration, refers to it as a much needed textbook, and Dr. Adolf Meyer has not only written the foreword but has also said that it is a "helpful guide." This brief review merely records with grateful appreciation the real contribution it makes to an ever increasing hospital need.

On page 112, Mr. Davis writes particularly of the regressed patient and of the importance of stimulating the "interest field" and of the re-creation of orderly associations and coöperative relationship. This is one of the strongest points of the entire treatise on "Interest and Effort."

In the somewhat extended experience of the writer with mental patients in

large state hospitals, there has been found to be a fundamental necessity of having patients participate in any physical exercise that will assist in normal physical functioning. This point is vital. It is hoped that Mr. Davis may be able to observe and write about the physical training and recreational activities which are carried on in hospitals where neither age nor sex will have an influence on the findings but will thus have a bearing on regressed states for both men and women.

There have been control situations in Veterans' Facility hospitals that do not exist in other large hospitals, such as sex and age among patients, and nearly always there are well trained assistants. In state institutions it is often necessary to take on as assistants in physical training and recreation employees who have shown interest in the development of such a division of hospital service but who have not had any formal education or training for the work; and who have no knowledge of the educational and understanding technics of psychology, though they have a sympathetic attitude toward the mentally sick that is highly desirable. After such employees understand in particular that every effort must be made to replace sordid, unhealthy, and filthy habits by helping to create a new situation and to awaken interest in life, they frequently give most valuable assistance in the work, and kindly, friendly encouragement to the patients. Such workers may not understand "Practical Teaching Principles" but they can render more helpful service to patients by studying carefully "Formal and Informal Exercises" (Chapter V).

One very strong feature of this book of great value to institutions, is the consideration given to nurses and attendants, as untrained workers, who are assigned to work in recreation or physical training, and programs for their instruction are presented. Inability to plan ahead the sequence of events—either exercises or games—is due to the great lack of training and practice in theory. The author recognizes that any work of this character is under medical direction, and the responsibility of coöperating with the authorities in the matter. Ways and means by which a progressive program may be organized are pointed out.

There are analytical studies and charts worthy of serious attention, but, best of all, are the suggestions for future study presented in several section.

The efforts of the joint authors have certainly met with success in that the text is written in a concise manner, emphasizing throughout the deep interest held in the proper practice of "Recreational Therapy."

ELEANOR C. SLAGLE

The Thyroid: Surgery, Syndromes, Treatment—*By E. P. Sloan, M.D. Springfield, Ill.: Thomas,* 1936. 376 pp. Price, $10.00.

If a word of apology is needed for publishing in a public health journal a review of a book devoted largely to surgery, it may be found in the preface, in which the author stresses the preventive aspect, expresses his hope that what he has written will be of interest to the public health official, and says flat-footedly that control of thyroid disease is the province of preventive medicine, which, properly applied, will save immeasurably more lives than the surgeon's art can. It is unusual as well as refreshing to find a book in which the preventive side is so well presented along with competent treatment.

The discussion from the endrocrine standpoint is good, and the handling of pre-operative treatment, operative technic, and post-operative management is excellent. A criticism one is

inclined to make is that there is apparently lack of sufficient discussion of the question of metabolism as it relates to the thyroid problem. It is true that a general discussion which covers the ground fairly well is given, but it might be elaborated to make it of more use to the average man. There is a splendid chapter on the thymus.

The author expresses himself in an unusually clear and instructive fashion. The illustrations are exceptionally good. The printing and make-up of the book are what we have come to expect from the publisher. DUDLEY A. ROBNETT

Workers' Nutrition and Social Policy—*International Labour Office (League of Nations). Geneva. London: P. S. King and Son,* 1936. 249 pp. Price, cloth $2.50, paper $1.50.

A survey of data on the diets of workers in Europe and North America leads to the conclusion that large numbers of the industrial population are inadequately nourished. Such malnourishment and under-nourishment occur not only in impoverished and depressed areas, but in the most advanced industrial countries in times of normal business activity.

The cause of this condition is stated to be chiefly an economic one, although ignorance and ineffective use of available income are factors, as is also the non-use of the potential capacity of agriculture. The solution of the problem lies in research and education, social legislation leading to improved purchasing power, and international cooperation.

Although the data given in this bulletin on actual consumption of foods by workers are somewhat limited, the report contains much valuable and provocative material, which should be of especial interest to sociologists and nutritionists. There are able discussions of dietary standards and the nutritional needs of workers in various occupations. The social-economic aspects of the problem are likewise set forth in considerable detail.

Copies of this well printed report can be obtained in this country from the World Peace Foundation, 8 West 40th St., New York, N. Y. JAMES A. TOBEY

Your Child in Health and in Sickness—*By Hugh L. Dwyer, M.D. New York: Knopf,* 1936. 333 pp. Price, $2.75.

This is a convenient and practical handbook on child care from the standpoint of modern preventive pediatrics. It is written with the intelligent mother in mind. The text is readily comprehended and appropriately illustrated.

Each step that should be taken in raising the child from infancy to adolescence is considered. Results of scientific research of foods, immunities, and child guidance are incorporated. The material is singularly free from fads or fancies and should prove of considerable value in guiding young mothers in sensible methods of preserving and promoting the health of their children. RICHARD A. BOLT

Medical Aspects of Crime—*By W. Norwood East. Philadelphia: Blakiston,* 1936. 437 pp. Price, $6.50.

The author of this book writes from a background of 36 years of experience as Prison Medical Officer, Medical Inspector of Prisons, Prison Commissioner, and head of the Prison Medical Service of England and Wales. In the first 4 chapters he reviews the prison administration problems in England for the past two centuries and devotes considerable time to a historical résumé of conditions of English prisons in the early 18th century up to the present date. He makes comments relative to changes in the laws of prisons, the changes in the attitude of the general public toward crime and prisoners, and finally compares the physical welfare of

the present English prisoner with that of the early 18th century prisoner. The entire book is composed of lectures and papers which he has written and published in book form with special chapters devoted to attempted suicide, observations on exhibitionism, relationship of the skull and brain to crime, relationship of cellular imprisonment to detention in association, mental inefficiency and adolescent crime, suicide from the medical-legal aspect, mental defectiveness with alcohol and drug addiction, medical aspects of prison labor, mental aspects of crime, mental problems connected with the prosecution of offenders, sterilization, prison reaction types, psychological medicine, and criminal law.

In these various papers and lectures Dr. East has successfully evaluated the various problems of modern penal administration from the medical viewpoint and has injected a large amount of common sense in giving his personal opinions relative to some of the more modern ideas in the realm of criminology. He speaks from practical experience and with a mind apparently open to the many researches that have been made in this field, and his deductions are the product of the same experienced prison administrator. His analysis of 1,000 consecutive cases of attempted suicide, which is a criminal offense in England and punishable by 2 years' imprisonment, is very interesting. He reviews the literature of phrenology and the findings of such well known authors as Lombroso, Goring, McDougall, and others, and states that the students of criminology today have discarded phrenological speculations and have turned to psychology, the science of behavior, for an explanation of anti-social conduct.

In discussing the prison reaction types he speaks of 6 types: depressive reaction, impulsive reaction, hysterical reaction, paranoid reaction, mental deterioration, and malingering, and discusses each type. He feels that simple sterilization of criminals is of little eugenic value but more thought and research should be given to castration as a method of treatment of sex offenders in an effort to have them make a sex readjustment.

This book should be of great interest to all students of criminology, prison administrators, prison medical officers, and those interested in forensic psychiatry. He decries the ultra sympathetic approach to the problems of criminals which is frequently prevalent in the field of psychology.

P. C. ROBERTSON

The Growth and Distribution of Population—*By S. Vere Pearson, M.D. (Cambridge), M.R.C.P. (London). New York: Wiley,* 1935. 448 pp., 20 ill. Price, $4.00.

The author of this sociological work is physician to the Mundesley Sanatorium, Norfolk, England.

Information respecting the author's background, in addition to that suggested by the titles of his recent papers, may be found in the Preface where he states:

> An understanding of the problems connected with the growth and distribution of population requires a knowledge of economics and psychology, two sciences which I have studied for more than thirty years. I do not refer so much to the economics and psychology of the textbooks as to the elementary common-sense forms, a knowledge of which an average man or woman acquires from life's experience and from nowhere else. These require neither instruments nor laboratories.

As a consequence of this postulate the author states that he reached conclusions that "differ in many particulars from the conclusions arrived at by those who write on the subject of population."

The 23 chapters deal with a wide variety of subjects embracing climate, agriculture, property, law, government,

growth of cities, sanitation, vital statistics, love, town and country planning, ground values and property appraisals, "traffic troubles," housing, and emigration. The book is based essentially on the principles set down by Henry George and his followers. When these principles are generally accepted human geography, the author believes, will enter a new era.

The author displays an easy facility for disposing of the work of distinguished scientists in remarks pregnant with opinion. Moreover, these remarks, among others, are too frequently terminated with a gratuitous exclamation point. In referring to Raymond Pearl's fly experiments, which formed a chapter in his work on population growth, the author remarks, "Pearl's years of labour are sterile. Flies in bottles are really unlike assemblages of human beings!" Statements based on opinion are not limited to the author's references to scientists. For example, in a discussion of contraception he writes that the moral atmosphere of classes and groups in society that use contraceptives is generally low.

In spite of its shortcomings this personal record of a physician's relationship to the world about him is stimulative and deserves to be recommended to those interested in human affairs of the present and future.

The typography of the book is excellent. An adequate index is provided. There is no bibliography.

WILLIAM M. GAFAFER

Eye, Ear, Nose and Throat Manual for Nurses—*By Roy H. Parkinson, M.D. St. Louis: Mosby,* 1936. 232 pp. Price, $2.25.

In bringing his book up to date, Dr. Parkinson has again demonstrated his appreciation of the rapid growth of knowledge needed by our nurses in the care of eye, ear, nose and throat. We are all too prone to lump the whole subject under a few general rules of no specific value for guidance to those outside the profession needing wholesome advice.

This new and revised edition, especially part three, deeply impresses upon our minds not only the distinct necessity of a definite technic for the care of each specialty listed but a fundamental knowledge needed in directing those about us on questions that come up from time to time.

We welcome this book as a worth while asset to our reference library.

L. ELEANOR KEELY

Health Stories, Book Three—*By Anna B. Towse, Florence E. Mathews, and William S. Gray. Chicago, Ill.: Scott, Foresman & Co.,* 1935. 208 pp. Price, $.76.

This is a new book in the Curriculum Foundation Series and is intended for third grade children. Its immediate predecessor was reviewed in these columns some months ago. The current book maintains the same high standards of interest and usefulness.

MERRILL E. CHAMPION

Preventive Medicine—*By Mark F. Boyd, M. D. (5th ed.) Philadelphia: Saunders,* 1936. 561 pp. Price, $4.50

A book which has reached its fifth edition has usually proved its worth. The reviews of this work from the first edition on have been uniformly favorable. It has met with wide use and given general satisfaction.

So many new things come up in bacteriology and preventive medicine that the necessity for frequent editions of a book on either of these subjects is manifest. New material has been included in this edition on colds, ringworm, psittacosis, diphtheria, encephalitis, poliomyelitis, pneumonia, tuberculosis, malaria, typhus, and relapsing fever, making in all an edition of 33 pages.

This edition is well printed and bound and can be recommended as bearing the general excellent character of its precedessors and as being up to date. MAZŸCK P. RAVENEL

Healthful Living—*By Harold S. Diehl, M.D. New York: McGraw-Hill,* 1935. 354 pp. Price, $2.50.

Common sense and balance characterize this helpful book by Dr. Diehl. It is thoroughly scientific in its approach to the major health problems, and modern in its presentation.

The chapters on Stimulants and the Normal Sex Life may be too well balanced for the "last Puritan" on the one hand, or the "released modern" on the other, but at any rate these difficult subjects are presented with clarity and sanity.

The chapter on Exercise-Fatigue-Rest is reassuring to those of us who have felt that while exercise has its place in the health program it cannot accomplish miracles. Dr. Diehl takes issue with the physical culturists who claim that "exercise and diet will prevent everything from neurasthenia to cancer, from baldness to flat feet."

Very practical suggestions are offered on the choice of foods, weight and its control, and digestive disturbances. The results of the latest scientific research are incorporated in the chapters on Specific Disease Prevention and the Glands and Their Internal Secretion.

Dr. Diehl's sympathetic, as well as scientific, handling of the health problems of advancing years gives a poetic flavor to the concluding chapters.

RICHARD A. BOLT

Public Administration—*By John M. Pfiffner, Ph.D. New York: Ronald Press,* 1935. 530 pp. Price, $4.00.

Designed primarily as a textbook for courses in public administration, this volume should prove a useful reference guide for health administrators who desire to familiarize themselves with trends in governmental organization and with practical developments in public management—local, state, and national. References to public health are frequent throughout the text, together with constructive discussions of relationships of various governmental junctions. Defects in administrative methods are considered objectively; and more than one side of a debatable practice or organization plan is presented.

The 24 chapters are arranged under 5 major headings: organization, personnel, financial administration, administrative law, and public relations; the latter, for example, dealing with the public and its servants, reporting to the public, and standards for measuring administrative performance. The advantages and limitations of boards and commissions, the significance of the merit system, budget planning and purchasing are considered in the light of the mature experiences of the author. This volume is further characterized by clarity of presentation of technical details, abundance of helpful references, and good printing.

IRA V. HISCOCK

New Pathways for Children With Cerebral Palsy—*By Gladys Gage Rogers and Leah C. Thomas. New York: Macmillan,* 1935. 167 pp. Price, $2.50.

There are very few books of a practical nature written in English which deal with the education and reëducation of children with spastic paralyses. This book is exceptional in its method of presentation and lucid descriptions. It can be read with profit by parents and teachers as well as by those entrusted with the technical methods of treating the aftermath of cerebral palsy.

The summer camp with a definite and constructive program of activities for these handicapped children is

recommended. In order to stimulate and maintain interest, it is set up along the lines of Robin Hood and his band of merry men. Robin Hood's Barn becomes the center of activity. The authors stress the importance of conscious relaxation for these children and give concrete suggestions to inculcate the health habit.

The chapter on Muscle Training through Indirect Methods is especially helpful. The illustrations of apparatus used add to the value of the book. The possibilities and limitations of surgical treatment of cerebral birth palsies are given briefly in a chapter by Dr. R. Nelson Hart of the Shriner's Hospital in Springfield, Mass.

Part II discusses in a sympathetic manner the responsibilities of the parents, the importance of a case history, and the arrangement of the child's room. The educational aspects are well balanced in the concluding chapter.

RICHARD A. BOLT

The Legal Aspects of Milk Control—*By James A. Tobey. Chicago: International Association of Milk Dealers*, 1936. Price, $3.00.

Copies of this valuable text, which covers such topics as the public control and sanitary regulation of milk, licensing, standards, pasteurization, tuberculin testing, containers, and liability, and has references to more than 300 court decisions, can be ordered through the Book Service of the A.P.H.A.

Health Center Districts, Statistical Reference Data, Five-Year Period, 1929-1933 *(3rd ed.)—Compiled by Godias J. Drolet and Marguerite Prudence Potter; prepared under direction of Kenneth D. Widdemer, Committee on Neighborhood Health Development, Department of Health, New York City*, 1935. 140 pp. Price, $1.00.

The third edition of this useful statistical handbook meets a growing demand on the part of health and social agencies, and other professional groups, for localized vital statistics as a basis for sound program building. The 140 pages contain not only statistical tables, giving basic information concerning population, births, infant and maternal mortality, and important causes of sickness and death by districts for the entire city, but also an enlightening graphic presentation by health areas of characteristics of eight "Sore Spot" districts, or districts where the most difficult health and social conditions exist and where the city's most active district health development has occurred.

The material contained in this handbook and the method of presentation illustrate methods of appraising needs which have heretofore been only partially utilized in health administration. After commenting on the helpful guidance to be derived from such information, the health commissioner makes the following statement regarding health district organization as a means of securing successful health service in a large city:

> Advance in public health depends on a better understanding and a health consciousness on the part of the general public. To attain this an intimate contact between the health agency and the workers and the public is essential. Health work should be emphasized and developed from within small units of population carefully linked with supervision from without. The health center is something that the public can see, feel, and have a part in. Health center activities can be adjusted to meet local conditions and needs. Public health programs have too often failed to make progress because of lack of understanding and team play between health officials, nonofficial agencies and medical groups. Health centers based on friendliness and understanding should help to remedy such situations.

One of the first steps of the Committee on Neighborhood Health De-

velopment, before recommending formal organization of district health centers, as described in the handbook, was to survey the distribution and composition of the population, neighborhood by neighborhood in each of the five boroughs, the existing health and hospital facilities, the size and distribution of the school population, and especially health conditions, mortality and morbidity records in every section. With these data, showing needs, responsibility, and opportunity, practical boundaries for each district were outlined. Recognizing the limitations of statistical data for single years when broken down for small areas, the committee assembled this 5 year experience. The handbook is a valuable contribution, not only as a source of information for workers in New York City, but as a reference book for teachers and students of vital statistics and health administration elsewhere.

IRA V. HISCOCK

The Normal Diet and Healthful Living—*By W. D. Sansum, R. A. Hare, and Ruth Bowden. New York: Macmillan,* 1936. 243 pp. Price, $2.00.

This book is an outgrowth of the custom of the authors for several years to meet daily with groups of patients to discuss subjects, particularly those connected with nutrition. These mutual exchanges of ideas proved of benefit to both patients and the authors. It is aimed to present in simple language the practical application of recent discoveries in this field. "If even a greater part of our present nutritional knowledge . . . were well utilized, not only malnutrition but many common ailments would in a very large measure disappear."

The first 3 chapters of the book deal with essential food substances, their sources, and the purposes they serve. The following chapters deal with the physiology of digestion and a study of metabolism; the elimination of wastes, and discussion of the dangers attending the use of cathartics; discussion of overweight and underweight, their causes and treatment; the influence of diet on growth and development of teeth. "A seemingly irrelevant chapter on focal infection is included to show that certain diseases which many have ascribed to diet are really of bacterial origin, and that a cure must be brought about by removing the bacteria." The closing chapter gives a survey of methods of treatment including brief discussions on rest, dietotherapy, physical treatment, psychotherapy, drugs, vaccines, sera, glandular preparations, surgery, X-ray and radium, nursing. Emphasis is laid on the intelligent use of the many therapeutic agents available, which is necessary for the best interest of the patient. In the appendix are given suggestions on planning the family menu, with sample menus of different types of diets.

This little volume is a valuable contribution in supplying to the public badly needed reliable information based on our present knowledge of health and nutrition. The general public is being increasingly and alarmingly preyed upon by faddists and quacks motivated by personal gain in exploiting their dieting systems, cures, and treatments. Reliable information based on recent discoveries is not easily available to a large proportion of the population. They get only fragments of the facts in advertisements too often distorted and perverted to serve selfish interests. Presentation of accurate information in simple, non-technical language from authoritative sources is the only way to combat this evil successfully. To this end the authors of this book have contributed a real service.

D. BREESE JONES

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

For Better Record Keeping—Recommendations for the standardization of reports of health department services are made by a committee of the State and Territorial Health Officers. All administrators will want to study this.

ANON. Tabulation of Health Department Services. Pub. Health Rep. 51, 36:1236 (Sept. 4), 1936.

Here Is Solid Achievement—How Newark gets practically all its preschool population immunized against diphtheria by everlastingly sticking at it is told in sufficient detail to stimulate others to try to beat the record.

CRASTER, C. V. Diphtheria Control by Immunization. Health Progress (New Jersey Health and Sanitary Association), 3, 4:6 (Sept.), 1936.

Scarlet Fever Prevention Abroad—Warning against the dangers of crowding in isolation wards, this British author favors the isolation of scarlet fever at home. When properly protected, the routine exclusion from school of other children in the family is not warranted, so he holds.

FORREST, A. W. Scarlet Fever Control on Modern Lines. Pub. Health, 49, 12:412 (Sept.), 1936.

Fewer Children Are Burned—Among preschool children burns are the most frequent cause of accidental death, but fortunately the numbers of such deaths show a tendency to decline. Relative rates are broken down in age groups and sections of the country. This is another example of the value of applying statistical methods to safety studies.

GAFAFER, W. M. Some Changes in the Relative Mortality from Accidental Burns among Children in Different Geographical Regions of the United States. 1925–32. Pub. Health Rep. 51, 38:1308 (Sept. 18), 1936.

National Progress and Public Health—Wholesome soul searching invited by one who dares the health worker to look up out of his deep little rut and consider what he is doing in terms of social welfare. A good dose for all to take.

LINDEMAN, E. Social Planning for Tomorrow. Pub. Health Nurs. 28, 9:561 (Sept.), 1936.

Good News for Old-Timers—Viewers-with-alarm are wont to insist that the average age at death has increased only because we save more babies, and that older people die earlier than their grandaddies did, due to the particular pet theory of the alarm-viewer. This life table built upon New York City census findings shows that people past their prime also enjoy an improving expectancy of life.

MALZBERG, B. Life Tables for New York City. New York Dept. of Health Quart. Bull. 4, 3:74 (Aug.), 1936.

Sound Advice for Parents—Entertaining discussion of the inadvisability of stuffing a prescribed diet into children. If allowed to do so, healthy children will select an adequate diet from a well supplied family table.

SWEET, C. Voluntary Food Habits of Normal Children. J.A.M.A. 107, 10:765 (Sept. 5), 1936.

How Long, Oh Lord, How Long?—We can take no pride in our public

health measures, we cannot pretend to be civilized, this author contends, so long as we maintain our present attitude toward venereal diseases. What we should be doing is set forth for all to see and ponder over.

POPENOE, P. The Family and Society. Pub. Health Nurs. 28, 9:567 (Sept.), 1936.

Frontal Attack Upon Syphilis—An unusually fine symposium on the newly emphasized syphilis control program which should be read by all public health administrators:

VONDERLEHR, R. A. The Administration of the Syphilis Control Program.

SMITH, D. C. Practical Epidemiology of Syphilis.

MOORE, J. E. Development of Adequate Treatment Facilities for the Control of Syphilis.

CASSELMAN, A. J. Efficient Laboratory Service in the Syphilis Control Program.

STOKES, J. H. Education of the Physician and the Movement for Venereal Disease Control.

NELSON, N. A. The Civilian Educational Program in the Control of Syphilis. J.A.M.A. 107, 10 and 11:782 (Sept. 5), 1936.

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WELLS, W. F., and BROWN, H. W. Recovery of Influenza Virus Suspended in Air and Its Destruction by Ultraviolet Radiation. Am. J. Hyg. 24, 2:407 (Sept.), 1936.

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CLINICAL TUBERCULOSIS. Edited by Benjamin Goldberg, M.D. Philadelphia: Davis, 1935. Vols. I and II. Set, $17.50.

HANDBOOK OF HEALTH EDUCATION. A Guide for Teachers in Rural Schools. By Ruth E. Grout. Garden City: Doubleday Doran, 1936. 298 pp. Price, $1.80.

BRITISH MASTERS OF MEDICINE. Edited by Sir D'Arcy Power. Baltimore: Wood, 1936. 242 pp. Price, $3.00.

LIVE LONG AND BE HAPPY. By Lewellys F. Barker. New York: Appleton-Century. 224 pp. Price, $2.00.

WHY BE TIRED? How to Make the Most of Your Energy. By Daniel W. Josselyn. New York: Longmans Green, 1936. 115 pp. Price, $1.00.

TO RAISE THESE HALT. By Fred Rothermell. New York: Furman, 1936. 350 pp. Price, $2.50.

ROMANY REMEDIES AND RECIPES. By Gipsy Petulengro. New York: Dutton, 1936. 47 pp. Price, $1.00.

THE JOY FAMILY. Malden Health Series. A Health Program for Grade II. By C. E. Turner, Alice L. Beckwith and Nell Josephine Morgan. New York: Heath, 1936. 130 pp. Price, $.56.

HEART DISEASE AND TUBERCULOSIS. By S. Adolphus Knopf. Livingston, N. Y.: Livingston Press, 1936. 108 pp. Price, $1.25.

THE PSYCHOLOGY OF DEALING WITH PEOPLE. By Wendell White. New York: Macmillan, 1936. 256 pp. Price, $2.50.

NURSING AS A PROFESSION. By Esther Lucile Brown. New York: Russell Sage, 1936. 120 pp. Price, $.75.

THE PROBLEM OF NUTRITION. League of Nations. Vol. I. New York: World Peace Foundation, 1936. 98 pp. Price, $.50.

HYDRAULIC AND ROAD QUESTIONS IN CHINA. League of Nations. New York: World Peace Foundation, 1936. 213 pp. Price, $1.75.

THE FORCES IN FOODS. By Howard V. H. Inches. Boston: American Dietetic Research Foundation, 1936. 123 pp. Price, $1.00.

THE TEACHING OF PHYSICAL EDUCATION. By Jackson R. Sharman. New York: Barnes, 1936. 237 pp. Price, $1.60.

THE PROFESSIONAL ENGINEER. By Esther Lucile Brown. New York: Russell Sage, 1936. 86 pp. Price, $.75.

RESEARCH IN DEMENTIA PRECOX: PAST ATTAINMENTS, PRESENT TRENDS AND FUTURE POSSIBILITIES. New York: National Committee for Mental Hygiene, 1936. 320 pp. Price, $1.50.

ADVENTURES IN LIVING: 5 Vols. By Thomas D. Wood, *et al.*

Now We Are Growing. 218 pp. Price, $.60.

Many Ways of Living. 209 pp. Price, $.60.

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Blazing the Trail. 247 pp. Price, $.60.

How We Live. 328 pp. Price, $.80.

New York: Nelson, 1936.

ASSOCIATION NEWS

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G. Harold Warnock, M.D., 528 Seward St., Rochester, N. Y., Epidemiologist-in-training, State Dept. of Health

SEDGWICK MEMORIAL MEDAL

AT the New Orleans Annual Meeting, the Sedgwick Memorial Medal, given "for distinguished service in public health," was awarded to Frederick F. Russell, M.D., Lecturer in Preventive Medicine and Public Health in Harvard Medical School and Harvard School of Public Health.

Frederick F. Russell, M.D.

This medal, awarded by a special committee of the American Public Health Association annually, was created in memory of the late William Thompson Sedgwick, Professor in Massachusetts Institute of Technology, and one of the outstanding investigators and teachers in the field of public health.

For 22 years, beginning in 1898, Dr. Russell was a member of the Army Medical Corps, and is now Brigadier General of the M.O.R.C., U. S. Army. He rendered distinguished service in the field of public health by demonstrating for the first time the efficacy of vaccine prevention of typhoid fever among the United States troops mobilized along the Mexican border in 1911 and subsequent years.

In 1920 Dr. Russell became Director of the Public Health Laboratory Service of the International Health Board, Rockefeller Foundation, and later succeeded to the position of General Director of the International Health Board, now the International Health Division of the Foundation, from which he retired in 1935. Since 1924 he has been a member of the Public Health Council of the State of New York. He was awarded the Distinguished Service Medal in 1919. He is a Fellow of the American College of Surgeons, the New York Academy of Medicine, the American Medical Association, the Association of American Physicians, the Royal Medical Society of Budapest, Hungary, and a corresponding member of the Gesellschaft der Aerzte, Vienna, Austria. He became a member of the A.P.H.A. in 1920 and a Charter Fellow in 1922.

NEWS FROM THE FIELD

FRANKWOOD E. WILLIAMS, M.D.

MENTAL health workers mourn the sudden and premature death of Dr. Frankwood E. Williams, for he was one of the country's outstanding leaders in mental hygiene and for many years its foremost spokesman. Dr. Williams received his medical education at the University of Michigan, and immediately after graduation, in 1912, became resident physician at the State Psychopathic Hospital in Ann Arbor, going from there to the Boston Psychopathic Hospital, then serving as Medical Director of the Massachusetts Society for Mental Hygiene. He was Associate Medical Director, and, subsequently, Medical Director of The National Committee for Mental Hygiene, being connected with the committee from 1917 to 1931. He was Vice-Chairman of the National Health Council 1922–1923.

Dr. Williams's 14 years of service with the National Committee were coincident with the period of its greatest growth. During this time the mental hygiene movement made world-wide progress, culminating in the First International Congress on Mental Hygiene held in Washington in 1930 and attended by representatives from 50 countries. Dr. Williams organized the scientific program which was so largely responsible for the success of this notable conference.

Dr. Williams touched the mental hygiene movement at many of its most vital points, helping powerfully to shape its philosophy and direction, and profoundly influencing the thought of all workers in mental health and related fields. The present-day conception of mental health as a broad and inclusive term, meaning not merely freedom from mental disease but the capacity for personal and social adjustment in all its phases, is to no small degree due to his work. To him mental health stood for the expression of human behavior at its best, for the wholesome fulfillment of personality, the ability to attain and maintain satisfactory human relationships. As such it embraces many aspects of life not formerly considered as matters of health and goes beyond "health" in the restricted sense of that term. Hence the influence of mental hygiene upon fields of endeavor outside of public health proper, and the wide scope of its social inferences and applications. In its preventive and positive aspects, Dr. Williams saw that it could not be confined to the psychiatrist, but, being a basic factor in all human affairs, was of vital interest to the general practitioner, pediatrician, nurse, social worker, educator, minister, and others dealing with human problems.

Dr. Williams was a great educator and an effective interpreter of mental hygiene teachings in all their implications. As a lecturer and writer he was much in demand and he contributed widely and deeply to professional and public education in mental hygiene. He edited *Mental Hygiene* the official organ of the mental health movement in this country from its inception in 1917 for 15 years. His untimely death brings to a close, all too soon, a notable and brilliant career.

ETHER DAY

ETHER Day was observed on October 16 at Harvard Medical School. Dr. Paul Dudley White, Assistant Professor of Medicine, delivered the principal address.

ARMY MEDICAL LIBRARY ANNIVERSARY

THERE will be a celebration of the One Hundredth Anniversary of the founding of the Army Medical Library, of Washington, on November 16.

The celebration will be held in the Library building at 8:00 P.M., and more than 1,000 invitations have been issued, approximately half of these to foreign institutions and libraries, and individuals well known in the fields of medical science and in the history of medicine. At the invitation of the Surgeon General of the Army, Sir Humphry Davy Rolleston, Bart., of Haslemere, Surrey, England, has consented to deliver the oration. Sir Humphry was formerly Regius Professor of Physic of the University of Cambridge, and is interested in the history of medicine and particularly in the Army Medical Library, which makes his coming visit of particular interest and significance. The program will include an introduction by the Librarian and an address of welcome by the Surgeon General of the Army, Major General Charles R. Reynolds, to be followed by an examination by the invited guests of the operation of the library with explanations by the staff, and a display of rare books and manuscripts. Following the program refreshments will be served and music will be furnished by the U. S. Army Band. Colonel Harold W. Jones, Medical Corps, the Librarian of the Army Medical Library, is General Chairman of the meeting.

AMERICAN CONGRESS OF PHYSICAL THERAPY

AT the 15th annual convention of the American Congress of Physical Therapy, held in New York, September 7–10, William Bierman, M.D., of Mount Sinai Hospital, New York, was elected President. He succeeds John S. Hibben, M.D., of Pasadena, Calif.

HUMAN GENETICS

THE Bureau of Human Heredity, of London, is collecting material dealing with human genetics.

The Bureau is directed by a Council representing medical and scientific bodies in Great Britain. It is affiliated with the International Human Heredity Committee, which insures coöperation in areas where research is proceeding.

The Council would be grateful to receive all available material from institutions and individuals, furnishing well authenticated data on the transmission of human traits whatever these may be. Pedigrees are particularly desired; twin studies and statistical researches are also relevant.

Material should be given with all available details in regard to source, diagnostic symptoms and the name and address of the person or persons who vouch for accuracy. All such details will be regarded as strictly confidential.

Those wishing for a copy of the Standard International Pedigree symbols may obtain one from the Bureau of Human Heredity, 115 Gower Street, London, W. C. 1, England.

HUGH S. CUMMING

ON January 31, 1936, Dr. Hugh S. Cumming * retired as Surgeon General of the U. S. Public Health Service, a position which he had held from February, 1920, until that date (*A.J.P.H.*, Mar. 2, 1936, p. 312).

In honor of Dr. Cumming, a document has been published giving the speech of the Honorable S. O. Bland, of Virginia, in the House of Representatives (Feb. 24), and letters from President Roosevelt and the Secretary of the Treasury.—*Dr. Hugh S. Cumming, Surgeon General of the U. S. Public Health Service.* Gov. Ptg. Office, Washington, 1936.

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* Fellow A.P.H.A.
† Member A.P.H.A.

RAY LYMAN WILBUR COLLECTION ON SOCIAL PROBLEMS

THE Hoover War Library, a part of the Stanford University Library at Palo Alto, Calif., is assembling detailed historical material about the history, objectives, and activities of the various organizations related to the health field.

It is planned to make these materials part of the Ray Lyman Wilbur Collection on Social Problems in the Hoover War Library. This will be a separate unit which contains the files and records of the White House Conference on Child Health and Protection, Better Homes in America, the President's Conference on Home Building and Home Ownership, and an extensive collection on medical economics.

According to Mrs. Inez G. Richardson, who is Curator of the Collection, this information and the materials will be made available for the use of a wide range of students in training for positions of leadership in education and public health.

The American Public Health Association has been invited to submit information regarding its historical origin and its present activities.

SHORTAGE OF PUBLIC HEALTH NURSES

ACCORDING to a special report on health department nursing service, prepared by the Advisory Committee of the National Organization for Public Health Nursing, Boston leads in the 10 largest cities in the country in the number of public health nurses with 45 per 100,000 population, and Chicago is the lowest with 17 per 100,000. The following numbers are given for the other large cities:

Detroit	32 per 100,000
Cleveland	30 per 100,000
Milwaukee	30 per 100,000
Pittsburgh	28 per 100,000
Baltimore	26 per 100,000
St. Louis	22 per 100,000
Philadelphia	19 per 100,000
New York	18 per 100,000

WESTERN SCHOOL OF PUBLIC HEALTH

THE University of California and Stanford University have organized a Western School of Public Health to assist health departments of western states in the training of public health personnel. Social Security funds are used to finance the school. Dr. Karl F. Meyer,* San Francisco, is in charge.

WEST VIRGINIA INDUSTRIAL HYGIENE BUREAU

THE State Department of Health has established a bureau of industrial hygiene financed by federal funds matched by state appropriations, with Dr. Otto J. Swisher, Jr., Berkeley Springs, as director.

NEW LEPROSARIA

A SPECIAL committee of the Philippine Islands Bureau of Health has selected sites for 3 regional treatment stations for lepers in Luzon: Enrile, Cagayan; Bangued, Abra; and Norzagaray, Bulacan. The president of the islands advocates establishment of these stations, believing that it is unwise to segregate all lepers in Culion.

NEW HEALTH UNITS IN RHODE ISLAND

THE State Department of Health has established 3 new district health units in coöperation with the U. S. Public Health Service. Dr. James P. O'Brien, Woonsocket, will be in charge of the north district; Dr. Joseph Castronovo, Providence, the southeast district; and Dr. Raymond F. McAteer,† Peacedale, the south district.

SANITARY OFFICERS' ASSOCIATION

THE name of the New York State Sanitary Officers' Association has been changed to New York Health Officers' Association. Dr. Chalmer J. Longstreet,† Binghamton, is president.

* Fellow A.P.H.A.
† Member A.P.H.A.

NEW MEXICO HEALTH OFFICERS MEETING *

AT the Conference of New Mexico District Health Officers held in Santa Fe on July 10, the following resolution was unanimously adopted and forwarded to the secretary of the New Mexico Pharmaceutical Association:

WHEREAS the prevention of the spread of syphilis depends upon its treatment in the early contagious stage, and
WHEREAS in the 3 years only 2 requests have been made to the state laboratory for diagnostic outfits for use in the early sero-negative stage, and
WHEREAS we have heard evidence that in the early stages many people seek and secure prescriptions from drug stores, and
WHEREAS it is incontrovertible that no treatment secured in this way is of any value for the cure of syphilis or the elimination of contagion, now therefore be it
RESOLVED that this second conference of the New Mexico District Health Officers urge the New Mexico Pharmaceutical Association to take whatever steps it finds practicable to discourage and to prevent the prescription by drug store clerks and pharmacists for the disease of syphilis and that they encourage all pharmacists in the state to urge upon their customers the great importance to themselves as well as to the public health of immediate medical treatment for this disease.

RHODE ISLAND'S NEW DIVISION OF INDUSTRIAL HYGIENE

THE State Department of Health has established a Division of Industrial Hygiene through funds available under the Social Security Act. Dr. James Philip Deery,† Wallum Lake, R. I., is Director.

CRAIG YEISER MEMORIAL FUND

THE University of Cincinnati has received a gift that in 5 years will amount to $55,000 from Mrs. Louise Fleishman Yeiser to establish in the college of medicine the Craig Yeiser Memorial Fund in Preventive Medicine, for research work.

MONTCLAIR HEALTH DEPARTMENT LABORATORY FIRE

ACCORDING to the *New York Times,* a fire of undetermined origin on August 17 caused damage estimated at more than $5,000 in the Health Department Laboratory on the third floor of the Montclair Municipal Building, Montclair, N. J. Valuable laboratory equipment was said to have been destroyed.

ANNUAL REPORT OF ROCKEFELLER FOUNDATION

DURING 1935, the Rockefeller Foundation expended $12,725,439, of which $2,733,050 was for medical science, and $2,200,000 for public health work.

TEXAS INDUSTRIAL HYGIENE DIVISION

THE State Department of Health has created a division of industrial hygiene financed by Social Security funds, with Dr. Carl A. Nau,† formerly Professor of Physiology, University of Oklahoma School of Medicine, as director.

INDUSTRIAL HYGIENE IN VIRGINIA

A NEW Bureau of Industrial Hygiene was established by the State Department of Health in Virginia on July 1, with Dr. William D. Tillson,† of Richmond, in charge. The bureau is financed by Social Security funds.

ERADICATION OF BOVINE TUBERCULOSIS

THE State of Rhode Island has been designated a modified accredited area, signifying the practical eradication of bovine tuberculosis. The recognition of Newport County as a modified accredited area placed all the counties in Rhode Island in that status. The term

* Fellow A.P.H.A.
† Member A.P.H.A.

is used by department and state veterinary officials to designate areas in which there is less than one-half of 1 per cent of tuberculosis among cattle as shown by official testing. All reactors to the tests must also be removed and precautions taken to prevent reinfection of the area.

With Rhode Island, there are now 41 states listed as modified accredited areas, in addition to the District of Columbia.

STUDY OF SILICOSIS

THE New York City Department of Health, Cornell University Medical College, New York Hospital, and the New York Tuberculosis and Health Association are conducting a study of silicosis made possible by an appropriation from the WPA. About 3,000 workers exposed to dust will be examined and some will be admitted to wards of the New York Hospital where intensive bacteriologic, pathologic and clinical studies, will be carried out.

CARY P. MC CORD HEADS DETROIT BUREAU OF INDUSTRIAL HYGIENE

THE Detroit Department of Health recently established a Bureau of Industrial Hygiene and Occupational Disease to coöperate with industry in the elimination of work conditions inimical to workers' health. It will be an advisory rather than a regulatory or law enforcing agency. The department is in charge of Dr. Cary P. McCord,* as Director; William H. Cary, Jr.,* as Sanitary Engineer; W. G. Frederick, as Chief Chemist; and Herbert Walworth, as Engineer for field activities.

PERSONALS

DR. MELVIN E. MCCASKEY, Little Rock, Ark., has been appointed to the State Board of Health to succeed the late Dr. Wells F. Smith, Little Rock.

DR. ROY E. SCHIRMER, formerly of Little Rock, Ark., has been named Director of the Mississippi County Health Unit at Blytheville, succeeding Dr. Arthur M. Washburn.†

DR. JAMES R. SCOTT,* formerly Health Officer of the Third Health District of New Mexico, has resigned from this position to resume teaching at the University of New Mexico, Albuquerque, in the Department of Health Education.

DR. JAMES T. DUNCAN,† Acting Health Commissioner of Wooster, Ohio, has accepted a position as Assistant Epidemiologist with the Virginia State Department of Health at Richmond.

DR. CHARLES J. FISHER, of Moulton, Ala., has been appointed Health Officer of Lawrence County.

DR. WILL M. HOYT, of Hillsboro, Ohio, has been appointed Health Officer of Highland County.

DEATHS

JOHN LEO BURKHART, Big Rapids, Mich., at one time State Health Commissioner, died July 12.

DR. ALEJANDRO RUIZ SOLER, of Puerto Rico, Insular Commissioner of Health from 1917 to 1925, died September 23. He was 50 years old. The first islander to head the Health Department, he assumed charge after passage of the organic act granting American citizenship to Puerto Ricans. Under his direction, the first hospital for tuberculosis cases was established on a 100-acre site near San Juan which he had secured as a gift.

SIR GEORGE SEATON BUCHANAN, whose official work in connection with public health and sanitation has been recognized throughout the world, died October 11, at the age of 67.

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* Fellow A.P.H.A.
† Member A.P.H.A.

DR. JAMES CLIFFORD PERRY,* of San Francisco, Calif., retired Assistant Surgeon General and Medical Director of the U. S. Public Health Service, died suddenly October 19, at the age of 72. In 1889 he entered the U. S. Public Health Service as an Assistant Surgeon. He became a Surgeon in the Service in 1904, a Senior Surgeon in 1915, Assistant Surgeon General in 1918, and the Service's Medical Director in 1930. Dr. Perry retired from the Public Health Service a few years ago.

* Fellow A.P.H.A.
† Member A.P.H.A.

CONFERENCES AND DATES

American Association of Railway Surgeons. Chicago, Ill. Nov. 5–7.

American Education Week. Nov. 9–15. Write: Educational Press Association, *New Jersey Educational Review,* 605 Broad Street, Newark, N. J.

American Society of Tropical Medicine. Baltimore, Md. Nov. 18–20.

Army Medical Library. Celebration of the One Hundredth Anniversary of the Founding. Library Building, Washington, D. C. Nov. 16.

Association of Dairy, Food and Drug Officials of the United States. Miami Biltmore Hotel, Coral Gables, Fla. Dec. 7–10.

Michigan Public Health Association. Lansing, Mich. Nov. 11–13.

National Association of Commercial Organization Secretaries. Omaha, Nebr. Nov. 8–11.

National Municipal League. Annual Conference on Government. Toledo, Ohio. Nov. 16–17.

New Jersey Health and Sanitary Association, Inc.—Sixty-second Annual Meeting. Hotel Woodrow Wilson, New Brunswick, N. J. Nov. 20–21.

New York Diabetes Association. New York Academy of Medicine, New York, N. Y. Nov. 13, 8:30 P.M.

New York State Association of Public Health Laboratories. New York State Laboratory. Albany, N. Y. Nov. 6.

Refrigeration Service Engineers Society. Hotel Gayoso, Memphis, Tenn. Nov. 11–13.

Southern Branch, American Public Health Association—Fifth Annual Meeting. Baltimore, Md. Nov. 17–18.

Southern Medical Association. Baltimore, Md. Nov. 17–20.

Positions Wanted

HEALTH OFFICERS

Physician, M.D. Medical College of Virginia; 3 years in the Medical Corps, U. S. Navy; city health officer for 16 years; desires position as health officer. Eastern city preferred. A-274

Physician, M.D. Hahnemann Medical College; special course in public health at University of North Carolina; wishes position as county health officer in the Northeastern area. Served as school physician of a small township for 7 years. Available at once. A-275

Physician, M.D. University of Wisconsin; M.P.H. Harvard School of Public Health; special courses in industrial hygiene; available now for an administrative position or one in industrial hygiene. A-279

Physician, M.D. New York Medical College and Flower hospital; extension course for public health officer, New York State Department of Health; 3 years' Urologic service in various New York City hospitals; desires position as health officer or in social hygiene department. A-266

Physician, M.D. University of Nebraska; 13 years' experience as city or county health officer in different sections of the West; desires position as health officer. Prefers West Coast. A-267

Physician, M.D. Indiana University; C.P.H. Johns Hopkins University; special courses in epidemiology, bio-statistics and public health administration; several years' experience as physician to city health department; desires position as full-time county health officer. A-269

Physician, M.D. Western Reserve University; 3 months' Health Officers' course at Johns Hopkins; 1 year's experience as instructor of Hygiene and Bacteriology; 4 months as county health officer; desires position as health officer or in the field of research. A-273

M.D. desires position as health officer. Has been city and school physician for four years. A-280

LABORATORY

Young man, M.S. in Bacteriology, University of Colorado, desires position in a health department laboratory or in the teaching field. Experience covers laboratory work in a state health department, graduate assistant in the department of bacteriology and public health of a university school of medicine, and bacteriologist and chemist of a city health department. West preferred. L-276

Young woman, B.S. University of Chicago, desires position in the field of bacteriology or parasitology. Has been employed as first assistant and research fellow in the department of bacteriology, parasitology and serology of a Chicago hospital, head of a private clinical laboratry, supervisor of a unit for survey of food handlers for carriers of E. histolytica under Chicago Board of Health, bacteriologist in a health department and in a tuberculosis sanitarium. L-277

Technician. Position with specialist or group by man having both clinical and laboratory experience with G.U. cases and syphilis. Competent Serologist. Thirteen years' full-time laboratory, all routines. Trained New York Post-graduate, St. Luke's and Massachusetts General. L-278

Young woman, B.S. Tufts College; M.S. University of Illinois; Ph.D. Western Reserve University; 4 years' experience as director of a city health department laboratory and several years' experience in both commercial and hospital laboratories; desires position doing research or routine in chemistry, bio-chemistry, bacteriology or serology in public health laboratory. L-272

Gentleman, with Bachelor of Bacteriology degree, Medical courses at University of Maryland for 4 years, wishes position as bacteriologist with chance to do investigation work, laboratory director or instructor in science and public health. L-281

Young woman, A.B. Barnard College, special courses at Delamar Institute of Public Health, Columbia University, at present Medical student at New York University, wishes part-time work in statistics or in a laboratory. L-282

Where no other address is given excepting the key number, address your replies to the American Journal of Public Health, 50 West 50th Street, New York City, indicating clearly the key number on the envelope. Your replies will then be forwarded.

Directory of Health Service

VITAMINS IN CANNED FOODS

V. VITAMIN G

● By 1926, it was apparent that the antineuritic vitamin B of earlier investigators was in reality a combination of several vitamins. In that year, Goldberger postulated the existence of a second vitamin associated with the so-called vitamin B "complex" which he designated as the P-P or pellagra-preventive factor. Evidence has been offered that this factor—subsequently named vitamin G—exerts a specific action in the cure and prevention of human pellagra and a similar condition in experimental animals (1).

Since Goldberger's pronouncement, considerable research has been devoted to resolution of the vitamin B complex and, what is equally important, to testing the specificity of vitamin G in the cure of human pellagra (2).

The findings in the laboratory and clinic have not, in some respects, been entirely in accord (3).

As reports of further investigations appeared in the literature, it became clear that the vitamin B complex had been aptly named. At one time claims were made for the existence of as many as eight factors in this complex (4).

While later work has reduced this number, we know today that what has been considered in the past as vitamin G is, in reality, a combination of several factors. A relation between experimental cataract and vitamin G has been described and, recently, another associated factor was postulated (5).

The significance of these individual factors in human nutrition has not as yet been established. However, regardless of this fact, students of nutrition are agreed that we must provide for the inclusion of so-called vitamin G—admittedly a complex—in the daily dietary. It is also obvious that until more is known about the individual components of the complex, we must continue to depend upon present day bioassay methods to determine the "vitamin G" potencies of foods.

In this connection, many canned foods have been found by comparative studies to retain their original vitamin G potencies as measured by methods now in common use (6).

Investigators in the U. S. Public Health Service have described their values in the control of human pellagra (7).

Commercially canned foods, therefore, may be used with confidence that they will supply amounts of vitamin G consistent with the amounts present in the raw food materials.

AMERICAN CAN COMPANY

230 Park Avenue, New York City

(1) 1926. U.S. Pub. Health Report, *41*, 297.
(2) 1934. Am. J. Med. Sci., *187*, 512.
1935. J. Am. Med. Assoc., *104*, 1377.
(3) 1932. J. Am. Med. Assoc., *99*, 120.
(4) 1933. J. Nutrition, *6*, 559.
(5) 1934. J. Nutrition, 7, 97.
1936. Science, *83*, 17.
(6) 1932. J. Nutrition, *5*, 307.
1932. Ind. Eng. Chem., *24*, 457.
(7) 1932. J. Am. Med. Assoc., *99*, 95.

This is the eighteenth in a series of monthly articles, which will summarize, for your convenience, the conclusions about canned foods which authorities in nutritional research have reached. We want to make this series valuable to you, and so we ask your help. Will you tell us on a post card addressed to the American Can Company, New York, N. Y., what phases of canned foods knowledge are of greatest interest to you? Your suggestions will determine the subject matter of future articles.

ACCEPTED AMERICAN MEDICAL ASSN. Council on Foods

The Seal of Acceptance denotes that the statements in this advertisement are acceptable to the Council on Foods of the American Medical Association.

American Journal of

Public Health

And The Nation's Health

Volume 26 December, 1936 Number 12

Maternal and Child Welfare
ELIOT

Control of Pneumonia
COLE

Virus Diseases
GOODPASTURE

Rabies
WEBSTER

Index to Volume 26

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American Journal of Public Health

and THE NATION'S HEALTH

Official Monthly Publication of the American Public Health Association

Volume 26 December, 1936 Number 12

CONTENTS

Continued on page vi

Contents of previous issues of the American Journal of Public Health and The Nation's Health can be found by consulting the Readers' Guide in your library.

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Address correspondence regarding subscriptions, advertising, reprints, etc., to American Public Health Association, 374 Broadway, Albany, N. Y., or 50 West 50th Street, New York, N. Y.

Entered as second-class matter at the Post Office at Albany. N. Y., September 17, 1932.

The Serum Disease Rates for

SCARLET FEVER STREPTOCOCCUS ANTITOXIN

GLOBULIN *Lederle* MODIFIED

PROMINENT CLINICIANS of considerable experience in the use of antitoxin in the treatment of scarlet fever collaborated recently with LEDERLE LABORATORIES to accumulate records on the incidence of serum sickness following use of LEDERLE's new Scarlet Fever Streptococcus Antitoxin, Globulin Modified.

A series of 306 cases were reported as having received the SCARLET FEVER STREPTOCOCCUS ANTITOXIN, Globulin Modified. The serum disease rate for all degrees and types was found to be only 12%! Of this total, 7% were mild in character; 3% moderate and 2% severe. In the majority of cases, serum sickness was limited to mild urticarial lesions which quickly disappeared.

The therapeutic dose of SCARLET FEVER STREPTOCOCCUS ANTITOXIN Globulin Modified *Lederle* is less than 4 cc. in volume, as compared with the therapeutic dose of 10 to 15 cc. commonly available before the introduction of "Globulin Modified" antitoxins. This represents an average reduction in bulk of the dosage of 70—80%!

Packages:

1 Prophylactic Dose in syringe (2000 units)
1 Therapeutic Dose in syringe (6000 units)

1. Hunt, Luke W., Jour. A.M.A., Vol. 99, No. 11, September 10, 1932, page 909.

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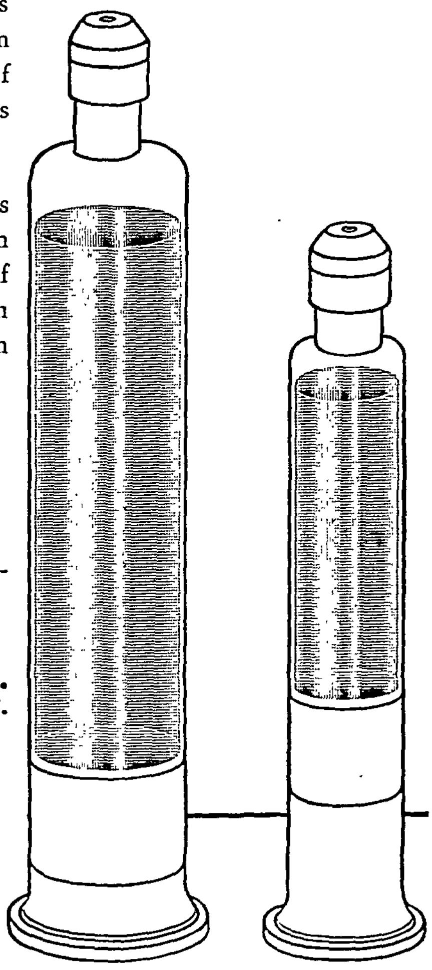

The OLD *and the* NEW
ACTUAL SIZE—THERAPEUTIC DOSE

Continued on page viii

Reprint prices furnished upon request

Contents—Continued PAGE

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For prophylaxis

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A combination of tetanus, perfringens and vibrion septique antitoxins for *prophylactic* use in any wound where there has been extensive laceration or crushing injury to tissues, puncture wounds or those contaminated with soil, before the diagnosis has been made or the infection has developed. Supplied in syringes and in vials containing: Tetanus antitoxin, 1500 units; Perfringens antitoxin, 2000 units; and Vibrion Septique antitoxin, 2000 units.

For treatment

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Milk is a necessary part of the daily diet but there are a large number of children and adults who drink no milk at all because of taste prejudice.

The important food value of milk is *below the cream line* because milk is one of the best food sources for Calcium — and Calcium is probably the greatest single deficiency in the American diet.

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MEETINGS OF AFFILIATED SOCIETIES
and A. P. H. A. Branches

Society	*Secretary*	*Place and Time of Annual Meeting*
Connecticut Public Health Assn.	Ira V. Hiscock	Waterbury, Dec. 16
Florida Public Health Association	S. G. Thompson, D.P.H.	Tampa, Dec. 7–9, 1936
Georgia Public Health Association	M. E. Winchester, M.D.	To be announced
Massachusetts Public Health Assn.	G. Donald Buckner, S.B.	Boston, Jan. 28, 1937
Michigan Public Health Association	Marjorie Delavan	To be announced
Missouri Public Health Association	Dr. C. F. Adams	To be announced
New Mexico Public Health Assn.	Paul S. Fox	To be announced
Northern California Public Health Association	Dr. I. O. Church	To be announced
Ohio Federation of Public Health Officials	W. D. Bishop, M.D.	To be announced
Pennsylvania Public Health Assn.	J. M. J. Raunick, M.D.	To be announced
Public Health Association of New York City	Frank Kiernan	First scientific meeting; George Washington Hotel, New York, N. Y., Dec. 3, 1936
South Carolina Public Health Assn.	Laura Blackburn	To be announced
Southern California Public Health Association	Charles W. Arthur	To be announced
Texas Public Health Association	Lewis Bracy	El Paso, Tex.
Virginia Public Health Association	B. B. Bagby, M.D., Pres.	To be announced
West Virginia Public Health Assn.	John Thames, M.D.	To be announced
Southern Branch, American Public Health Association	G. Foard McGinnes, M.D.	To be announced
Western Branch, American Public Health Association (joint meeting with Arizona Public Health Association)	William P. Shepard, M.D.	Phoenix, Ariz., April, 1937

Application for Membership

I wish to apply for membership in the American Public Health Association.

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Print name in full and give degree

Street and City.............................. State...............
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Present public health occupation..................................

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AMERICAN PUBLIC HEALTH ASSOCIATION

50 WEST 50TH STREET, NEW YORK, N. Y.

American Journal of Public Health
and THE NATION'S HEALTH

Volume 26 December, 1936 Number 12

Progress in Maternal and Child Welfare Under the Social Security Act*

MARTHA M. ELIOT, M.D., F.A.P.H.A.

Assistant Chief, Children's Bureau, U. S. Department of Labor, Washington, D. C.

EIGHT months have elapsed since the passage of the supplemental appropriation act making available funds for grants to states authorized under the Social Security Act of August, 1935. It is appropriate that a report of progress should be given at this time to the Child Hygiene Section of the American Public Health Association with regard to the activities under those parts of the act that have to do with maternal and child health, crippled children, and child welfare, as outlined in the provisions of the first 3 parts of Title V of the act and as administered by the Children's Bureau. The provisions of the act with respect to maternal and child health and services for crippled children I can assume are known to this audience; those that have to do with child welfare are probably less well known and their purpose and scope and the correlation of this program with the other 2 will be referred to briefly.

In all 3 parts of the title preventive services are stressed. The maternal and child health program is entirely a preventive one; in the crippled children's program, though medical and surgical care and hospitalization of crippled children are the chief services rendered, nevertheless, care of children suffering from conditions that may lead to crippling is specifically authorized in the act, and such preventive services are actually being rendered at this time in a number of states, notably in Mississippi, Alabama, and Tennessee, where the recent epidemic of poliomyelitis has occurred. In the child welfare program attention is being directed toward the prevention and amelioration of those social and economic conditions that lead to maladjustment of the individual child in his relation to family and community. The act permits the state public welfare departments in coöperation with the Children's Bureau to make grants to local communities in order to pay part of the cost of services for dependent, neglected, and homeless children, and children in danger of becoming delinquent, with the pur-

* Read before the Child Hygiene Section of the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 21, 1936.

pose of providing for children living in the rural and semi-rural areas the type of care that has been available for these socially handicapped children in larger cities for many years.

During the past 8 months rapid progress has been made by the states in establishing these 3 programs. On the map in Figure I will be seen the status of each state and territory and the District of Columbia on October 15 of this year. Symbols show whether plans for maternal and child health, for crippled children, or for child welfare services have been submitted to and approved by the Children's Bureau.

During the 5 months ending June 30, plans submitted by 46 states, Hawaii, Alaska, and the District of Columbia for maternal and child health services for the fiscal year 1936 were approved by the Children's Bureau. One additional plan has been approved for 1937 and it now appears that the last of the 51 will very soon be approved.* One state with an approved plan for 1936 has not yet submitted a plan for 1937. The rapidity with which the maternal and child health programs have been developed has been due in no small part to the experience gained by the states as a result of the administration of the Maternity and Infancy Act from 1921 to 1929.

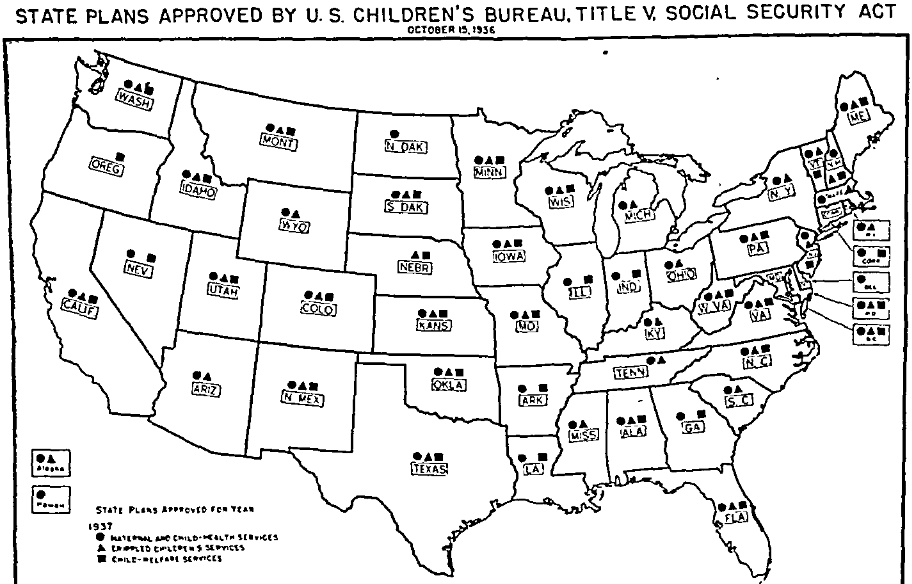
Plans for services for crippled children were submitted by 44 states before June 30 and 38 of these were approved by the Children's Bureau. When approval was withheld, the reason was in all cases one involving the question of the authority of the state agency submitting the plan to assume under the state law final administrative control over all parts of the program as required by the federal act. Since July 1, 2 additional plans have been approved and 4 others are being studied from a legal and administrative point of view to determine whether or not legislative action will be necessary before approval can be given. Seven states have not yet submitted plans. The difficulty in some cases is a question of legal authority; in others one

* Approval has been given to this state's plan since this paper was read.

FIGURE I

STATE PLANS APPROVED BY U. S. CHILDREN'S BUREAU, TITLE V, SOCIAL SECURITY ACT

OCTOBER 15, 1936



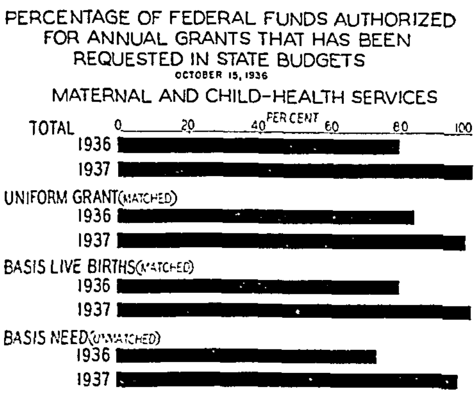
See Notes, p. 1162.

of financial participation by the state.

Plans for child welfare services were submitted by 40 states before June 30, and payments under approved plans were made to 34. Since the beginning of the new fiscal year 7 additional state plans have been approved and 1 other has been submitted and is awaiting approval. In these programs, as in those for crippled children, some states have not had an official agency in a position to coöperate. Inasmuch as the legislature in nearly all states will meet in regular session in 1937, it is expected that practically every state will be coöperating in all 3 programs by the end of the current fiscal year.

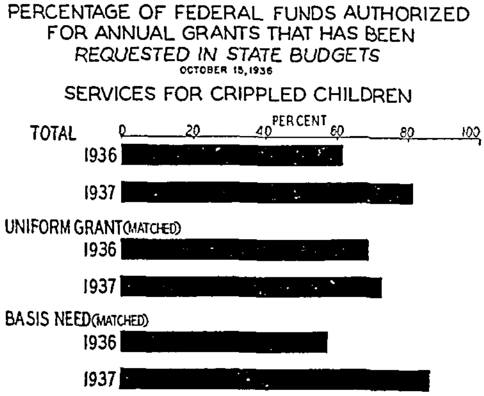
The Social Security Act authorizes annual grants to states for maternal and child health in the amount of $3,800,000; for crippled children in the amount of $2,850,000; and for child welfare in the amount of $1,500,000. Figures II, III, and IV give the proportion of each of these funds that was requested by the states and territories submitting plans for the 5 months ending June 30, 1936, and also for the fiscal year 1937. The total amount for maternal and child health is shown divided into its component parts as outlined in the act, the amount granted as uniform allotments of $20,000 to each state, the amount

FIGURE II



See Notes, p. 1162.

FIGURE III

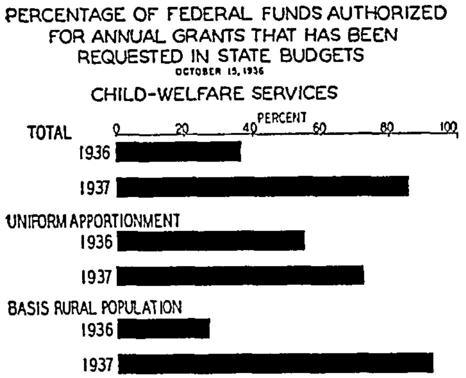


See Notes, p. 1162.

granted on the basis of live births (both of which must be matched by the states), and the amount granted on the basis of the financial need of the states for carrying out their state plans. During the 5 month period ending June 30 plans and programs were in a preliminary stage of development; information with respect to available matching funds was not always complete; the inclination to limit new work until a sound policy of expansion was established was nearly universal. As a result, a smaller proportion of available federal funds was requested for 1936 than has since been requested for the year 1937. That this development should have been relatively slow is, of course, desirable.

Figure III shows the proportion of authorized grants requested by the states in 1936 and 1937 for services to crippled children. Again, the total amount has been divided as outlined in the act, into that granted as uniform allotments of $20,000 to each state and that granted on the basis of the need of the state as shown by the estimated number of crippled children and the cost of care. Here, too, the proposed plans for 1937 call for a larger proportion of available federal funds than did the plans for 1936. Figure IV shows

FIGURE IV



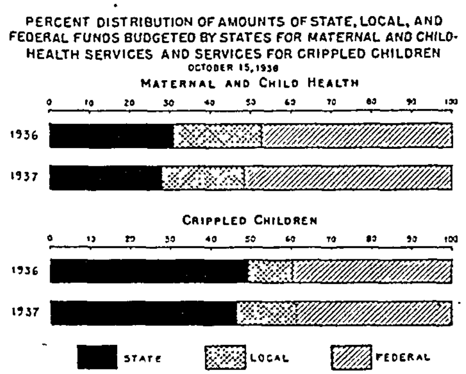
See Notes, p. 1162.

proportion of authorized grants for child welfare services. These also have been divided, one amount being granted as uniform allotments of $10,000 to each state, the other on the basis of rural population. The rapid progress that has been made in establishing this almost wholly new program is evident.

Further analysis of the budgets for maternal and child health and for crippled children submitted by the states to the Children's Bureau for both 1936 and 1937 shows additional facts that are of interest. In each case the budgets submitted give the cost of the total proposed plan and the amounts to be charged to state, local, and federal funds. The per cent distribution of the amounts charged to each of these funds for the fiscal years 1936 and 1937 has been computed for the total group of states coöperating and is shown in Figure V. The large proportion of state funds appropriated for work with crippled children is in marked contrast to that for maternal and child health, and indicates a strong tendency for centralization of the crippled children's program in the state agency. There is, however, some indication that the amount of local participation is increasing. Together state and local funds for crippled children far exceed federal funds. This excess is apparently accounted for by a large excess of state funds in a small number of states where work for crippled children has been highly organized in the past and where state and local appropriations have been substantial over a period of years. It should be pointed out, however, that of the 44 states submitting plans for crippled children, 5 have not appropriated or set aside enough funds in 1937 to match even the uniform grant of $20,000. The increase in the proportion of federal funds budgeted for maternal and child health for 1937 as contrasted with 1936 is due not to a decrease in state and local funds used for matching but to requests for increased allotments from the unmatched fund that is granted on the basis of need of the state to carry out its state plan. Again, 5 states have not appropriated or set aside enough to match the uniform grant of $20,000 for maternal and child health.

More detailed study has been made of the estimated expenditures as budgeted by the states for the 5 months ending June 30, 1936. Of the total amount provided for maternal and child health, nearly 20 per cent was budgeted for the services of physicians, either as full-time administrators or as part-time assistants in health conferences or in postgraduate teaching; 38 per

FIGURE V



cent was budgeted for public health nurses; 5 per cent for dental, nutrition, and health education services; 6 per cent for clerical assistance including some for vital statistics; 16 per cent for travel for state and local staff; and 15 per cent for biological supplies, equipment, printing, and other incidental expenditures. Nearly 80 per cent of the total is being spent for actual service for mothers and children. Apparently federal funds are being used by the states to build up the maternal and child health program by providing full-time physicians to give medical leadership to the program, part-time physicians for conferences and clinics, special consultants and instructors in pediatrics, obstetrics, nutrition, and health education, supervisory public health nurses and many staff public health nurses. Actually half the cost of the services of physicians administering the maternal and child health program and of the specialized public health nursing supervisors was charged by the states to federal funds in the 1936 budgets. An even larger proportion of the expenditures planned for medical, nutrition, and health education specialists, and for instructors in pediatrics and obstetrics is being charged to federal funds, reaching more than 90 per cent in the case of special consultants, instructors, and members of advisory committees. On the other hand, slightly more than half of the cost of dental services and staff nurses, and considerably more than half the cost of clerical services, supplies, and incidental expenditures is being borne by state and local funds. Similar figures for 1937 are not yet available for comparison with 1936.

Study of the detailed budgets for the crippled children's program for the 5 months ending June 30 shows a quite different picture, as would be expected from the terms of the Social Security Act. Funds for state-wide administration and for services of full-time personnel constitute only 11 per cent of the total state, local, and federal funds included in the plans of 38 states; 81 per cent was budgeted for hospitalization, surgical and medical costs, and costs of appliances. Other expenditures, including supplies and equipment and also travel, largely for state staff, made up the remainder. If the provisions of the act that have to do with the establishment of state-wide services for crippled children, and especially those that have to do with after-care are to be carried out adequately, it is likely that there will be increased allotment of funds for administration and field personnel and a proportionate decrease in allotments for surgical services. Obviously, the best operative procedure may be wasted if follow-up care by nurses, physiotherapists, physicians, and social workers is inadequate.

Considering the short time that funds have been available and the nature of the requirements of the act, the progress made by the states in planning and in the administrative aspects of the program has been, on the whole, satisfactory.

But what about actual programs and the progress made in the establishment of new services or the extension of old programs? The Social Security Act requires that maternal and child health services shall be extended to local communities and administered by them. Reports of progress made during the first 5 months of the program were submitted to the Children's Bureau by 47 states in July and August of this year and show some striking evidences of the initiation of new work. In 208 counties, 77 towns, and 11 health districts, new maternal and child health services were put into operation before June 30 and expansion of service was reported from 167 additional counties,

42 towns, and 16 health districts, making a total of 521 local communities with improved maternal and child health service in the first 5 months of the program. Among these have been listed the placement of public health nurses in full-time county health units and in unorganized communities; the organization of maternal, infant, and preschool health conferences and centers under medical and nursing supervision; the institution of maternity nursing services; venereal disease control among pregnant women and children with congenital syphilis; midwife instruction and supervision; nutrition services; school health examinations; immunization programs; and dental hygiene programs. In 20 states plans for the "demonstration services in needy areas and for groups in special need" that are required under the act had reached the point where they could be put into actual operation before June 30; in 4 additional states the programs were ready for operation on July 1.

With respect to the plans for these demonstrations much could be said would time permit. It should be pointed out, however, that maternal care is the major objective of 31 such demonstrations described in the 1937 plans and part of a joint maternal and child health program in 18 others. Plans for the establishment of maternity nursing service at delivery for women living in rural communities have been reported by more than 20 states and in a few the plan includes provision for medical care as well as nursing. It is hoped that through these demonstrations there will be developed methods which are of sufficient practical value that many rural communities will be able to use them or adapt them to special needs. The emphasis that has thus been placed on the need for more adequate and more complete maternity service by physicians and nurses bodes well for improvement in service and the reduction of mortality rates, not only maternal rates, but also neonatal and fetal.

The state plans indicate clearly that improvement in maternity services and in the care of the new-born infant is generally believed to be a matter of professional and lay education, and that the responsibility for effective programs must be borne by clinicians and public health administrators working together. Professional education for physicians and nurses is a part of the proposed maternal and child health program in a majority of the states. The plans include short postgraduate courses or institutes in obstetrics or pediatrics for practising physicians, special postgraduate courses for physicians administering the maternal and child health programs, continuous staff education for public health nurses, and additional training for nurses who are to be specialized supervisors in this field.

The progress reports from the states showed that during the 5 months ending June 30, 13 states inaugurated postgraduate work for physicians in obstetrics and pediatrics, and 8 started postgraduate work for nurses. Altogether during this initial period, 65 nurses, 21 dentists, and 8 physicians received special training in some phase of the program. Coöperation between the state and county health departments and the state and county medical societies in the inauguration and carrying out of the postgraduate courses for physicians is described in all state plans including such courses as part of their program. Furthermore, in all approved state plans there appears evidence of actual coöperative planning by the health authorities with medical, nursing, and welfare groups and organizations, or of proposed coöperative activities to be carried out as the plans progress.

With respect to progress under plans for crippled children, information is somewhat more limited, largely on account of the fact that in many states the program is new and the development of plans necessarily slow. However, some information as to expansion of services is available. Progress can be measured in part by the strengthening of the state administrative staff and the staff needed for state-wide services for locating crippled children and for their after-care, a phase of the work that has been neglected in many programs in the past. During the first 5 months a total of 122 new full-time staff members were appointed by 33 states. This number includes 15 full-time physicians as administrators, 33 orthopedic nurses, 10 physical therapists, 17 social workers, 6 workers described as supervisors, and 41 clerical assistants. Many other such workers are planned for and the positions will be filled as qualified candidates are found. A large number of surgeons or physicians are assisting in the diagnostic clinics and in operative work on a part-time or a fee schedule basis.

Though in many states the period of operation of plans in the last fiscal year was very short, diagnostic clinics were reported to have been held in 7 states where the service is entirely new and from 11 other states reports were received showing expansion of this type of service into a number of the more remote areas not previously reached. Hospital facilities were increased or established for the first time in a number of states; facilities for convalescent care have been increased in only a few so far. Follow-up service and after-care by nurses and social workers is being augmented rapidly, but no figures are available with regard to the scope of these services. An excellent beginning has been made, however, in many states with respect to strengthening the central administrative staff and the field service, and the extent of the coöperative activities carried on by crippled children's agencies with medical organizations and with public health, public welfare, and vocational rehabilitation agencies is most encouraging.

In the program for child welfare, definite progress is being made in all of the states coöperating with the Children's Bureau. In 308 counties or districts (in 4 states districts are composed of several towns), child welfare services have been put into operation with the use of federal funds, supplemented by the localities. Workers attached to the state welfare departments are providing some case work and general child welfare service in 192 additional counties in order to demonstrate the necessity for more extensive work in individual counties. Local staff provided through federal funds to assist county welfare departments includes 271 social service workers. In addition 133 full-time workers have been employed by the state welfare departments for assisting local units and organizing state-wide activities, and 96 additional workers have been employed part-time by state welfare departments for carrying on the same program. In the field of child welfare, as in those of maternal and child health and crippled children, a shortage of well trained workers with experience in the special field delays and handicaps the program.

On the whole, the progress made in these various programs for the health and welfare of children is most encouraging. The figures just reported are based on the first 5 months only. Much more new work that was planned during the earlier months is now being put into operation. As the plans go forward, however, it becomes more and more evident that a preventive program, whether in the health or social welfare field, that is not supported by adequate facilities for correction of

handicapping defects or for the care of the more serious illnesses and maladjustments and is without resources to provide adequate food, shelter, and clothing, is itself seriously handicapped. Physicians may offer the best type of health supervision to mothers and children in conference or office, but unless facilities for adequate maternity care at delivery or for correction of the physical defects of children, or for their care during illness, are available to all, including those unable to pay for these services, the value of the health supervision given may be to a great extent lost.

A public health nurse can go only a certain distance in her maternal and child health program without adequate medical support, sufficient economic resources, and the assistance of social case workers for special problems. A child welfare worker must have at her command certain facilities to aid in the handling of children with serious social maladjustments. Treatment must be instituted quite as much for this socially handicapped child as for the physically handicapped, and knowledge and understanding of social causes and skill in handling the procedures of treatment are as essential for social adjustment as is medical skill and nursing in caring for the physically sick.

The need for correlated action by workers in the fields of health and social welfare becomes more and more evident as progress is made in the establishment of the basic services under the Social Security Act. Opportunity for demonstration of the effect of combined medical care and social treatment is made possible under the section of the act providing services for crippled children; opportunity for correlation of the health and social services for children living in rural areas will be increasingly possible as the establishment of county-wide programs of child welfare and child health provides the mechanism for this coördination.

The maternal and child welfare services are but a part of the total program for social security. The basic economic provisions of the act and of the whole relief program as well as the provisions for general public health and for aid to dependent children lay the foundation on which the special health and welfare services to mothers and children can be built. The need to focus attention on the child and his needs as a growing and developing individual must nevertheless still be of major concern in all our planning in the field of social welfare.

NOTES

FIGURE I—Since this map was prepared the following plans have been approved: maternal and child health services, Oregon; services for crippled children, Hawaii; child welfare services, Arizona, Delaware, Massachusetts, Michigan, North Dakota, and Ohio.

FIGURE II—This chart is based on requests from 47 states, Alaska, Hawaii, and the District of Columbia, as of October 15, 1936. Though a few states were not able to match in full the allotment for maternal and child health services for the fiscal year 1937, the total amount requested by the states for 1937 actually exceeded by $22,-166.59 the $3,800,000 authorized for annual grants because certain states were able to match part of the funds carried over as balance from 1936.

FIGURE III—This chart is based on requests from 38 states, Alaska, and the District of Columbia. A few states were not able to match in full the allotment for crippled children for the fiscal year 1937; others were able to match the full amount for 1937; and still others the full amount for 1937 and also part of the funds carried over as a balance from 1936. It is anticipated that at least the full amount authorized on an annual basis will be requested before the end of the present fiscal year.

FIGURE IV—This chart is based on requests from 36 states and the District of Columbia.

Immunity to Virus Diseases*

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TO understand thoroughly the mechanism of immunity to infection it would be necessary to know the factors concerned in the phenomena of susceptibility and invasion of the host; that is, the phenomena of pathogenesis. Unfortunately, at the present time knowledge of the pathogenesis of many infectious diseases does not rest upon a scientific foundation, and there is necessarily much empiricism in attempts to combat them. If you will look through the voluminous literature on the subject of immunity you will find a great deal about phagocytosis and antibodies and complement in general, but you are likely to look in vain for a scientific explanation of an acquired resistance to any specific infectious agent. Take the common disease typhoid fever for an instance. After the typhoid bacillus enters the mouth, knowledge of its adventures in the host which terminate in typhoid fever, practically ceases; and although vaccination by the introduction of dead typhoid bacilli seems to induce a limited resistance to subsequent infection, it is not known how this is, nor the reason for the more substantial immunity which follows recovery from an attack of the disease. Did we understand more thoroughly the pathogenesis of typhoid fever it is possible that even better means of inducing resistance would become available.

So it is with immunity to virus diseases. It is a very encouraging fact to those who are concerned with problems of prophylaxis that most virus infections leave the recovered patient solidly immune to a recurrence of the disease. Sooner or later we shall know how this is brought about, it is to be hoped. Then we should be able to protect without inducing disease.

There is, no doubt, a long chain of reactions between the infectious agent and the host, which leads to disease and to immunity. The weakest link in this chain should be broken, and the weakest link may be a different one for each type of infection. At the present time we do not know all the links, and fact must be supplemented by hypothesis, so that further pertinent data may be acquired.

Let us enumerate briefly some of the facts concerning immunity to virus infection, for with them must be constructed the temporary scaffold of experimental hypothesis.

1. *Most virus diseases are followed by a protective immunity.* In some cases the immunity is lifelong, in a few instances it is relatively brief. Among the former are smallpox, measles, mumps, yellow fever, and perhaps poliomyelitis. In the latter group are the common cold and influenza, diseases probably caused by cytotropic viruses, and the common fever blister or herpes simplex.

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 20, 1936.

2. *Viruses act as though they are antigenic substances.* This is an obvious inference from the fact of specific immunity.

3. *Immunes may be carriers of virus for a considerable period of time* in the case of infection by at least some viruses. Instances of this event are better known in animal diseases, such as fowlpox and infectious anemia of horses, than in those of man. The idea however has been advanced that durable immunity in man may be due to residual virus following infection, or to repeated sub-infections, although there is no very good evidence to support this view, as of general applicability.

4. *The degree of immunity to a specific virus* is variable, in the same individual and in different individuals.

5. *Individuals may become immune to certain viruses without having* suffered clinical *evidences of disease.* This occurs in the case of the poliomyelitic virus, and it has been explained on the assumption that repeated sub-clinical infections are responsible. There is however another important conception, namely, that cells may acquire an immunity, that is, become unsuitable media for a virus, from nonspecific causes, such as age, differentiation, state of nutrition and other such changes which alter cells. Should this be true, it seems possible that methods could be devised to utilize such nonspecific means of inducing resistance to certain virus infections.

6. *Treatment of susceptible tissue with chemicals may increase or decrease resistance to infection by some viruses.* Experimentally, such a procedure has proved effective in preventing nasal infection in monkeys by poliomyelitic virus. This result, however, is considered to be a blocking of a portal of entry, rather than an induction of an active immunity. What result this method may have in human prophylaxis remains to be seen.

7. *Subjects immune to a virus following infection usually contain specific neutralizing antibodies in their blood.* There is thus evidence of a humoral response to specific antigens present during virus infections.

8. *Prophylactic administration of serum of immunes may passively protect* for a relatively short time. Advantage of this fact has been taken in prophylaxis against measles, mumps, and canine distemper. Humoral antibodies evidently may prevent, under some circumstances, invasion by viruses.

9. *Administration of serum from an immune during the course of virus* infection is of little or no avail, and there seems to be no proven antitoxic effect.

10. *Recurrent attacks of a virus infection may take place in individuals whose blood contains neutralizing antibodies.* An example of this is to be seen in recurrent herpes simplex or fever blisters.

11. *Immunity to reinfection by a virus may occur before the active disease or lesion becomes quiescent or healed.* Warts and the salivary gland disease of guinea pigs are good illustrations. In such cases individual cells perhaps become immune more slowly than antibodies appear in the blood.

12. *Some viruses may be so modified by passage through an alien host that subsequent infection in an original host may be very mild, but sufficient to confer solid immunity to the virulent strain.* This of course is the basis of Jennerian vaccination, and the principle is now used in other instances such as the induction of active immunity to yellow fever by the use of mouse-brain virus.

13. *Inoculation of virus into an area not a natural portal of entry may lead to a mild infection followed by immunity.* In some instances, for example, immunity to poliomyelitis may follow intracutaneous inoculation of monkeys. But the method is not yet safe.

14. *There may be distinct antigenic strains of the same virus, which do not effectively immunize against each other.* For example the two or three strains of the virus of foot and mouth disease.

15. *In some instances in spite of the presence of specific neutralizing substances in the blood, there is little or no resistance to specific infection by a virus through natural channels.* This may be the case apparently in experimental poliomyelitis in monkeys. Rivers, Andrews, and others have demonstrated experimentally that certain living cells from normal or immune animals *in vitro* will permit growth of virus. But infection of these cells may be prevented by treatment with immune serum prior to but not after brief contact with active vaccinia or herpes virus.

16. *Administration of apparently non-infectious or killed virus as a vaccine usually does not result in protection.* If protection occurs under these circumstances it is questionable whether all virus activity was destroyed.

17. As a corollary it may be true *that all acquired immunity from the administration of virus vaccine results from active,* though *unrecognized, infection.*

Here then are a group of facts and inferences concerning immunity to virus diseases which at first glance seem to

be very confusing and to possess little analogy with other types of infection. In order to comprehend them intelligently and to deal with them experimentally in such a way that they may be useful, it is necessary to construct hypotheses into which these facts will reasonably fit. Only then may we utilize them to best advantage to forward experiment. It may be useful therefore to refer to some theoretical considerations which may be appropriate.

Infectious microörganisms reproduce themselves within the infected host under different conditions. For example, some grow only within the body fluids, some may grow either in the body fluids or within certain host cells. Still others seem to require the living protoplasm of the host's cells as a medium of growth. I have recently classified these groups as extracellular parasites, facultative intracellular parasites and obligate intracellular parasites.

It is not known whether viruses are living parasites or not, but all the knowledge we have of them indicates that they require, as do the obligate intracellular parasites, the environment of living cells of the host for their multiplication. They are therefore said to be cytotropic agents.

In order to emphasize the importance of an understanding of pathogenesis in relation to immunity let us contrast some of the theoretical possibilities with reference to the mechanisms of resistance to a group of parasites which invade and multiply in the fluids of the host, and the groups of viruses which seem to require the internal medium of living cells.

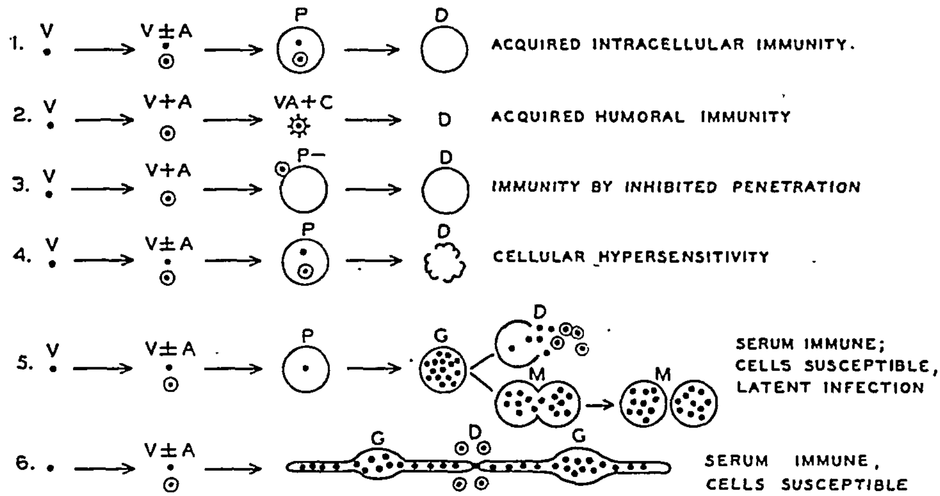
Let us consider acquired immunity to the extracellular bacteria first. The bacteria on entering the fluids of the host may become affected by opsonins or other antibodies, and be rendered more easily phagocytosed than normal. In this way they may be removed before they have a chance to induce disease. Or they may come in contact with lysin, be rendered soluble by complement, and destroyed before they gain a foothold.

These two possibilities, namely phagocytosis and the action of humoral antibodies, seem to be the chief, if not the only theoretical mechanisms for preventing infection in the actively immune host under the circumstances of invasion and growth of the microorganism in the fluids of the body.

As we have already stated, the viruses seem to require a living intracellular medium for reproducing themselves. The introduction of this element, the essential, living, host cell, into the pathogenesis of infection complicates matters considerably. For example, if virus is introduced into the fluids of a resistant host it may be either dissolved directly, or destroyed by phagocytosis, before it comes in contact with its required medium. If it does not reach susceptible cells no infection results. On the other hand a specific antibody often makes its appearance in the serum of a host as it acquires immunity, and this antibody may in some way prevent the virus from entering the susceptible cell. The action of antibody may enable complement to destroy virus before it enters the cell.

But these do not exhaust the possibilities. The virus may enter previously suspectible cells only to find them, after immunity is established, unsuitable for its reproduction, or so hypersensitive to its presence that they die before the virus can set about multiplying. Supposing that virus escapes the antibodies of the blood, it may still enter cells that permit its reproduction, if cellular immunity has not developed. Then it may grow, irritate the cell to division and thus enlarge the sphere of its influence; but

THEORETICAL MECHANISMS IN IMMUNITY TO VIRUSES



V = VIRUS PARTICLE A = HUMORAL ANTIBODY P = PHAGOCYTOSIS
C = COMPLEMENT M = MITOSIS G = GROWTH
P− = NO PHAGOCYTOSIS D = DESTRUCTION OF VIRUS

if it gets out of the cell the antibodies prevent its entrance into other cells. However it may persist, latent, within the cells and, taking advantage of opportunities, cause disease again.

The theoretical behavior of virus within a susceptible cell surrounded by fluid which contains effective antibodies is of especial interest in those infections which involve the architecturally complex cells of the nervous system. Structurally the neurons differ from most other cells of the body in the possession of very long, attenuated, cytoplasmic processes which may extend from the central nervous system to the periphery, or from the periphery, through ganglia, into the spinal cord or brain. If a virus can utilize the living cytoplasmic medium for reproduction then it seems obvious that a neurotropic virus might grow along one of these cellular processes from a peripheral portal of entry to its central terminus or *vice versa*. Another structural feature of neurons is that terminal cytoplasmic processes of one cell come very close to, or actually are in contact with, processes of the main body of other neurons, and it seems theoretically possible that virus might progress from one cell to another along these channels without exposing itself to the extracellular environment.

This is exactly what seems to happen in the course of neurotropic infections, and it has been demonstrated, in the case of experimental poliomyelitis among others, that virus may progress and the disease develop as usual, though specific circulating antibodies are present in the serum.

Because virus inside living cells should be protected from the action of circulating antibodies, it is not surprising theoretically that the introduction of immune serum during the course of disease does not seem to be of benefit. It is possible that some virus passing from one cell to another or otherwise discharged from an infected cell, as in the presence of necrosis, may

be inactivated and further extension inhibited or reduced; consequently serum therapy may possibly offer some advantage.

Possible explanations of certain facts of immunity to virus diseases, on the theory of cytotropism, may be partially illustrated graphically on the chart.

The theory of cytotropism of viruses, which hypothesizes that these active agents require a living intracellular environment for multiplication, fits best the known facts concerning the reaction between the host and the virus during infection; and it offers constructive suggestions for analyzing conditions of resistance which often supervene.

This theory does not necessitate a rigid definition of a virus, a requirement which at the present time would be impossible of fulfillment; for it is not known whether viruses are living parasites or sorts of autocatalytic ferments. But it is known that they act as though they were specifically antigenic. In this respect they behave like the antigenic proteids; and whether living or inanimate they would require the activity of living cells for their reproduction.

Because viruses are known to act like antigens and because experience of immunology up to the present time has been largely concerned with the study of serological antibody response to foreign proteids, it has perhaps been too generally expected that parenteral injection of inactive virus-containing materials would result in the production of a protective immunity. Such an expectation has not been realized. It seems probable rather that active immunity has only been induced by the introduction of active virus, and then only if infection, even though an inappreciable one, ensued. The immunizing antigen seems to be a very labile one. It is possible that it is produced only during infection.

The mechanism of the humoral antibody effect is as yet not understood, and the mere presence of antibodies in the blood is not an adequate assurance that the subject bearing them is immune. This is true especially in those viral infections in which the active agent has a predilection for the cells of the nervous system. The cytotropic hypothesis assumes under these circumstances that virus enters exposed neural processes without subjection to contact with antibody-containing fluid.

The very complexity of the pathogenesis of virus diseases may underlie the quite general occurrence of immunity following infection, because of the necessity for the fulfillment of many conditions in order that infection may take place; and likewise this complexity, as it becomes better understood, may offer exceptional opportunities for prophylaxis by the breaking at some vulnerable point of a long chain of necessary interactions between the host and its invader.

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Epidemiology and Symptomatology of Staphylococcus Food Poisoning*

A Report of Recent Outbreaks

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FOOD poisoning due to staphylococci was first reported by Barber [1] in 1914. At the present time 18 outbreaks have been recorded in which the offending staphylococci were shown to be toxic for man or monkey—by the ingestion of milk or broth cultures in 3 instances, and by the ingestion of filtrates in 15 instances. The incriminated foods have been cake and custard-filled or cream-filled bakery goods [2, 6, 7, 8, 10] in 10 outbreaks, raw milk [1, 4, 12, 13] in 4, while cheese,[3] chicken gravy,[5] chicken salad,[9] and tongue sandwiches,[11] were each responsible for a single outbreak. In addition there remains a significant number of food poisoning outbreaks in which staphylococci were thought, for good reasons, to have been the etiological factor though full confirmation is lacking.

The following report of recent outbreaks of food poisoning serves as a reminder of the growing importance of the problem, and is perhaps of value for the added clinical information it may contain.

On the morning of March 27, 1936, a Birmingham physician reported to the Board of Health that he had attended 12 Ensley high school students, all sick with food poisoning after eating cream puffs for lunch on the 26th. The severity of the illness varied though all had the same general symptoms.

Investigation disclosed that the school lunch-room was clean, and its operations met the sanitary requirements of the Board of Health. The lunch-room personnel had not recently changed, none had been ill, and bacteriological examinations (completed 6 months previously) had not disclosed carriers of intestinal pathogens.

For several months the lunch-room had served cream puffs purchased from the same bakery. On the day of the outbreak 18 dozen had been purchased; 4 dozen of these were taken from the school to a neighboring café where most of them were later recovered. There were 693 students fed; 165 ate cream puffs, and 94, or 57 per cent, of these were taken ill. The 528 students who did not eat cream puffs were not sick. Six additional cases developed from cream puffs taken home by lunch-room supervisors and eaten by individuals for the evening meal. In all, 122 cases were discovered, 94 from the school, 8 from cream puffs carried away

* Read at a Joint Session of the Laboratory and Food and Nutrition Sections of the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 24, 1936.

from the school, and 20 from cream puffs sold to 3 cafés and from the bakery truck.

It seems significant that, among 65 students who became ill after eating cream puffs for dessert, following the ingestion of other food, the onset was somewhat more delayed, and the illness decidedly more severe than among 29 who ate only cream puffs. Variations in the concentration of the gastric juice may partly explain apparent differences in susceptibility of these students to enterotoxin. Borthwick[14] states that the active principle of toxic staphylococcus filtrate is destroyed or reduced at a pH lower than 6.8 or higher than 7.8, and he reports rendering guinea pigs suceptible by adjusting the reaction of the stomach contents to a pH of 7.3.

Detailed clinical histories were obtained from both the victims and their attending physicians. The more typical cases may be described as follows:

Within 2–4 hours after eating there was first noticed a feeling of nausea. Severe abdominal cramps developed and were quickly followed by vomiting which was severe and continued at 5–20 minutes intervals for 1–8 hours. The vomitus was blood streaked in 13 per cent of the cases. A diarrhea of 1–7 liquid stools usually began with the vomiting or several hours after its onset. Blood, not infrequently, was present in the stool. During the acute stage the temperature was normal or subnormal, the pulse noticeably increased, there were cold sweats, prostration was severe, and the patients were very definitely in a state of shock. Headache was mild and of a short duration. Muscular cramping, usually of the flexors of the legs, was present in the majority. Dehydration was marked in some.

While the acute symptoms usually lasted only 1–8 hours complete recovery, because of prostration, was delayed for 1–2 days. During this time temperatures of 100° were not uncommon. Three cases were hospitalized. There were no fatalities.

These symptoms with their variations are summarized as follows: The most common interval between eating and the onset of illness was 3 hours. Eighty per cent were ill by the 4th hour, while in a small number the onset was delayed for 6, 7, and 8 hours. Twenty-one per cent were ill only for the short period of 1–4 hours while in 36 per cent recovery was delayed for 25–48 hours. Vomiting was the most

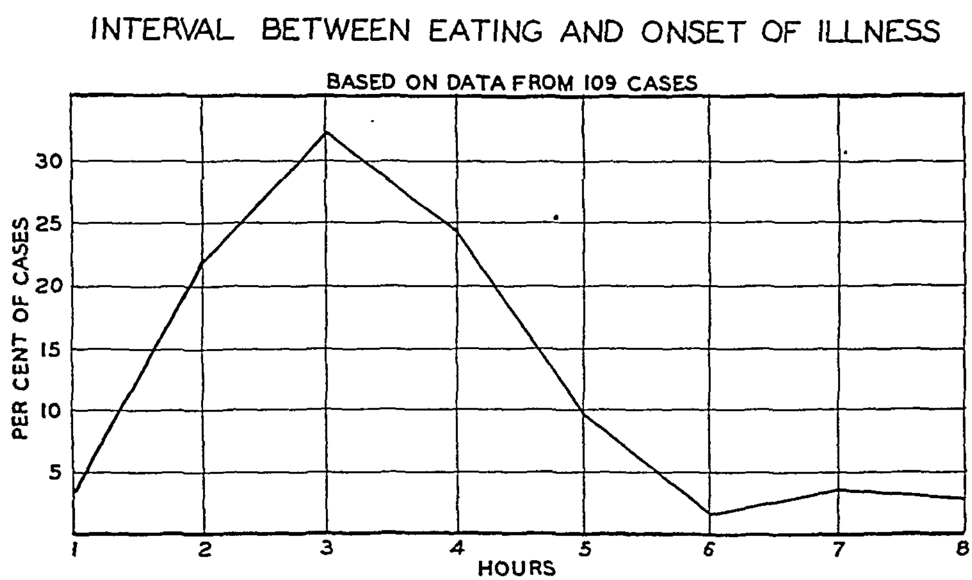

FIGURE I—Interval Between Eating and Onset of Illness

pronounced symptom, and in 50 per cent was described as "continuous." In the majority of cases (92 per cent), however, vomiting had ceased within 5–8 hours. There was severe vomiting in 78.2 per cent, severe abdominal pains in 62.5 per cent, mild diarrhea (1–7 stools) in 72.8 per cent, mild and usually transient headache in 58 per cent, mild muscular cramps in 51.3 per cent and sweating in 67 per cent. Prostration, dehydration, and the degree of shock varied accordingly.

TABLE I

SYMPTOMS OF FOOD POISONING

	Information from No. of Cases	*None* %	*Mild* %	*Severe* %
Vomiting	122	12.1	9.7	78.2
Pains in abdomen	122	4.7	32.8	62.5
Diarrhea	103	12.6	72.8	14.6
Headache	101	29.0	58.0	13.0
Muscular cramping	113	36.3	51.3	12.4
Sweating	100	33.0	67.0	

It should not be inferred from this discussion that the clinical features of staphylococcus food poisoning are distinguishable from those of Salmonella food poisoning, for such is not the case, only bacteriological studies are dependable. It is true, however, that the onset of illness in outbreaks due to the staphylococcus is usually within 2–4 hours after eating, and those due to the Salmonella group usually 12 hours or longer.

On inspection the bakery which furnished the cream puffs was filthy. Not only this, but certain conditions which prevailed were disgusting if not positively revolting. Three grossly insanitary toilets were repugnant and obnoxious. The building was not fly-proof and flies were embracing these toilets and the bakery products as a regular rendezvous. There were no proper washing facilities for the 35 employees, and no hot running water on the premises. Wash water for the utensils had the consistency of pea soup, no rinse was used, and the utensils were subsequently wiped with a dirty cloth. The greater part of the large and small equipment was inadequate, improvised, covered with filth, and in such a state of disrepair as to render cleansing impossible even under the best of conditions.

Raw materials were stored in open barrels entirely unprotected from dust, rats, and insects. The finished bakery products were subject to promiscuous handling and, before being wrapped, were often collected in an open garage within 15 feet of the insanitary toilets. Clothing worn by the employees was filthy. There was no history of recent illness, nor of boils or abscesses among the personnel. Such circumstances were not surprising, however, when we consider that for 3 years there had been no routine inspection of food establishments by the Board of Health because of severe financial restrictions. Other bakeries, inspected at a later date, were even more filthy—if such were humanly possible.

The cream puffs in question were all of one batch. The cream filling (approximately 12 gallons) had been heated in a copper kettle by steam for 6 minutes and then allowed to cool for 2½ hours before being placed in the shells. The heating temperature was indefinite and it is questionable whether the filling was rendered reasonably sterile. The time and conditions allowed for cooling were ideal for bacterial multiplication.

Nineteen cream puffs were examined. On physical inspection all appeared to be fresh. Direct microscopic examination of the filling showed large numbers of staphylococci and spore-forming bacteria. Agar plate counts on 4 specimens showed a bacterial content of 50 to 70 million per gram; 99 per

cent of these organisms were *Staphylococcus aureus*. From all 19 specimens *Staphylococcus aureus* was found in abundance, and in all *B. coli Communis* was also present. No bacteria of the Salmonella group were isolated and no carriers of these pathogens were found among the bakery personnel.

Jordan [3] has shown that staphylococci of diverse origin and cultural characteristics are capable of producing a filterable enterotoxin. Stritar and Jordan [15] conclude that there are no good criteria for the differentiation of various types of staphylococci and that in " food poisoning strains " there is no homogenicity of biochemical, hemolytic, or agglutinative characters. From studying a number of strains of staphylococci Woolpert and Dack [16] found that enterotoxin was not formed without the production of other exotoxins and that there seemed to be a rough correlation between the amount of food poison and the amounts of other toxins; these facts are borne out in this investigation.

Nineteen cultures of *Staphylococcus aureus* isolated from different cream puffs fermented maltose, dextrose, lactose, mannite, rhamnose, saccharose, and sorbite without gas; 6 fermented salicin after 1 week; none fermented xylose or inulin. All were hemolytic on blood agar. An antiserum made from one culture (C-3) agglutinated the remaining 18 cultures in amounts varying from ⅛ to ½ of the serum titer. These characteristics were the same for both enterotoxin producing and non-enterotoxin producing organisms.

Filtrates of 16 cultures were prepared according to Dolman's [17] modification of Burnet's method. Filtration was through Seitz pads (discarding the first portion of each filtrate) though Woolpert and Dack [16] have shown that these pads adsorb appreciable amounts of exotoxin. When tested with 1 per cent rabbit erythrocytes 5 filtrates produced no hemolysis, 10 were only slightly hemolytic when undiluted, while 1 (C-3) produced complete hemolysis in a dilution of 1/50. Using 2 rabbits, a filtrate of culture C-3 produced dermonecrosis in dilutions of 1/100 and 1/25. Filtrates of other cultures produced little (dilution of 1/5) or no dermonecrosis.

Filtrates for feeding experiments were prepared from broth cultures grown either in air or in 10 per cent

TABLE II

FEEDING EXPERIMENTS WITH BROTH FILTRATES OF STAPHYLOCOCCUS AUREUS ISOLATED FROM CREAM PUFFS

Culture	*Filtrate*	*Individual*	*Result*
C-6	6 c.c. 24 hr. broth	A	Not toxic
	20 c.c. 24 hr. broth	C	Abdominal cramps, headache
	6 c.c. 48 hr. broth	A	Not toxic
	12 c.c. 48 hr. broth	E	Not toxic
R-7	6 c.c. 24 hr. broth	D	Not toxic
	20 c.c. 24 hr. broth	E	Abdominal cramps, 6 liquid stools
	6 c.c. 48 hr. broth	E	Not toxic
	12 c.c. 48 hr. broth	A	Not toxic
R-1 *	10 c.c. 48 hr. broth	A	Not toxic
R-2 *	10 c.c. 48 hr. broth	B	Not toxic
C-2 *	10 c.c. 48 hr. broth	C	Not toxic
C-3 *	10 c.c. 48 hr. broth	E	Toxic (case E)
*	24 c.c. 48 hr. mixed	D	Toxic (case D)

* Grown in 10 per cent CO_2

carbon dioxide for 24–28 hours, and then passed through Seitz pads. In this way, and by graduating the dose, we hoped to produce filtrates only mildly toxic for human volunteers. Filtrates were diluted with 8 oz. of milk just before drinking. An equal number of controls took sterile broth in milk and none reacted. Human susceptibility to enterotoxin varies, and the number of persons used in feeding experiments was probably inadequate to prove the presence or absence of enterotoxin production in some of the strains tested.

Twenty c.c. of a 24 hour broth filtrate of staphylococci from two different cream puffs proved mildly toxic when fed to 2 individuals. One experienced mild headache and abdominal cramps, the other, abdominal cramps and 6 liquid stools. The onset for each was 3 hours. Other individuals receiving smaller amounts of 24 and 48 hour broth filtrates were not affected.

Cultures from each of 4 cream puffs were then grown in broth in an atmosphere of 10 per cent carbon dioxide for 48 hours and filtered. Ten c.c. of these filtrates were fed to 4 individuals while a 5th took 6 c.c. each of the filtrates from all 4 cultures, a total of 24 c.c. Three individuals were not affected.

Individual "D" who took the mixed filtrate was nauseated after 3½ hours, vomited 4 times in the course of 1 hour, the temperature dropped to 97.2° and pulse increased from 80 to 112. The white cell count rose to 15,000, blood pressure remained normal, and there was no diarrhea, prostration, dehydration, or abdominal rigidity. Recovery was complete in 4 hours.

Individual "E", who took 10 c.c. broth filtrate of culture C-3, was desperately ill for 3 hours. Nausea and vomiting developed 2 hours 45 minutes after drinking the filtrate. Vomiting was severe (5 times in the 1st hour). There were 5 liquid stools, 2 containing blood. Pallor was marked, the temperature fell to 96°, and the pulse rose from 84 to 130. Blood pressure fell from 120/80 to 60/40, the white cell count rose to 21,400 with 81 per cent polymorphonuclears. Headache

TABLE III

CASE "D"

Time	*Temp.*	*Pulse*	*Blood Pressure*	*White Count*	*Per Cent Polymorphonuclears*	
0	98.6	80	116/80			Drank 6 c.c. each of broth filtrates from cultures R1, R2, C2, C3. Total 24 c.c. in 8 oz. milk.
0:30						Ate light lunch
3:20 *						* Nausea and abdominal cramps
3:30			116/80			Vomited
3:40						Vomited
3:55						Vomited
4:00	97.2	112	116/80	12,200	71	
4:20						Vomited
4:30	97.8	80	116/80			
6:00				15,000		Recovered except for slight weakness
7:00						Complete recovery

* Onset 3 hrs. 20 min. after drinking broth filtrate. Nausea and abdominal cramps continued for 2 hrs.

TABLE IV

CASE "E"

Time	*Temp.*	*Pulse*	*Blood Pressure*	*White Count*	*Per Cent Polymorphonuclears*	
0	98.6	84	120/80			Drank 10 c.c. broth filtrate of culture C-3 in 8 oz. milk. Did not eat lunch.
2:45						* Nausea and abdominal cramps, slight dizziness
3:00						Vomited, large liquid stool, marked pallor
3:15						Vomited
3:30						Vomited, liquid stool
3:40						Vomited
4:00	97.4	120				Vomited, liquid stool
4:30	97.4	120				
5:00	96.0	110				
5:30	96.0	100	75/55	21,400	81	Bloody liquid stool
6:00	97.4	108	75/55			
6:30	97.0	130	60/40	16,400	77	Bloody liquid stool
9:00	98.6	110				Marked prostration

* Extreme nausea, abdominal cramps, and prostration continued for 4 hours from onset.

was mild at the onset and of short duration, there were cold sweats, and prostration was severe. There was no abdominal rigidity. Dehydration was moderate but probably did not entirely account for the increased white count. The acute symptoms passed in 4 hours but weakness persisted for 2 days.

The findings in these two experimental cases follow those of the mild and severe cases of food poisoning experienced in this outbreak and appear to establish *Staphylococcus aureaus* as the cause. The opportunities for contamination of the bakery products were so numerous that it seems highly improbable that the source of the infection can ever be determined. Cultures of staphylococci were isolated in large numbers from the throat of one of the bakery personnel, from various parts of the machinery, and from the feces of 1 patient. Their broth filtrates were not toxic with feeding tests.

The bakery was cleaned up and continued to operate. On May 11, 3 individuals, living in different sections of the city, were admitted to a local hospital severely ill with food poisoning. The symptoms were the same as those described for the first outbreak. All had subnormal temperatures and white cell counts above 10,000 (10,750 with 84 per cent, 11,850 with 78 per cent, 38,800 with 89 per cent polymorphonuclears). In addition each had marked abdominal rigidity (board-like in 2) and the general picture was that of an acute abdominal condition requiring surgery. In fact, a pre-operative diagnosis of "ruptured peptic ulcer" was made on 1 patient and a laparotomy performed.

Each patient had eaten in a different café and had partaken of cocoanut custard pie baked by the bakery involved in the first outbreak. Portions of two pies eaten by 2 individuals were recovered and found to contain enormous numbers of *Staphylococcus*

aureus. Twelve other persons were thought to have eaten portions of three pies involved but no other cases could be discovered. Following this incident, the bakery has been permitted to bake only bread and rolls.

It should be realized that the number of reported cases of food poisoning falls far short of indicating the frequency with which sporadic cases result from contaminated commercially prepared foods. Due to publicity given recent outbreaks in Birmingham numerous suspected cases of a sporadic nature have come to our attention, and we have every reason to believe that during the summer months such cases are of daily occurrence.

By way of controlling such outbreaks certain practices common to many bakeries should be eliminated. They have been emphasized in other reports but may well be repeated here. Custard-filling in the usual course of its preparation is heated to temperatures at which staphylococci will not survive, and failure to destroy the organism is evidence of improper cooking. Dack [2] has shown that the organisms in broth culture are destroyed by exposure to 80° C. for 15 minutes. McBurney [7] found that as many as 2,500,000 staphylococci per c.c. of liquid custard were killed by cooking at 85° C. for 10 minutes. To avoid contamination after cooking the filling should be properly covered, and cooled at refrigerator temperatures. Excessive handling of the shells or the filling should be avoided, and all machinery used should be thoroughly cleansed and properly sterilized. The finished product should be properly covered or wrapped, and stored at refrigerator temperatures. Obviously the building should be fly proof, and reasonably free of rodents and insects. Proper toilet facilities should be provided for the personnel. Machinery and equipment should be adequate to handle the volume of business undertaken.

Adequate inspection service, aside from checking all physical equipment, must exert some supervision over the methods of preparation and distribution of the food products. Those bakeries which cannot reasonably comply with regulations because of antiquated and improper physical equipment, or who refuse to comply for other reasons, should, at least, be promptly prohibited from making any product not subjected to the same oven temperatures as bread and rolls.

No matter how essential certain requirements may appear to the inspector they always seem unreasonable to the proprietor unless he understands why they are made. While educational programs are necessarily slow and time consuming, more progress can be expected if the proprietor understands how such control measures protect his business, as well as the public. Unless coöperation is obtained, inspection service reverts to purely police methods which are undesirable and often ineffective. Outbreaks frequently occur in bakeries that are scrupulously clean but where some breach of technic has presumably occurred. Educational programs directed toward plant operators and their personnel are, therefore, of considerable importance. Medical examinations and bacteriological attempts at detecting carriers would, as a routine measure, seem to offer little of definite value.

Finally, in the many cities where inadequate appropriations allow only a pretense at actual control of food products, it seems essential that the greatest effort be directed toward those small and large establishments which prepare, manufacture, and distribute foods, rather than the small retailers who may dispense products already contaminated before reaching their hands.

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Scarlet Fever Control

LAST February, Dr. Hobson of Oxford published a most interesting series of cases and observations. He found that:

1. An *erythema is inconstant in infections* due to a haemolytic streptococcus.
2. It may be a feature of those due to a non-haemolytic streptococcus.
3. Though it is more frequent in infections due to haemolytic streptococci, it is a poor guide to the course, prognosis, or infectivity of the disease in a given patient.
4. Infections due to haemolytic streptococci *with or without an erythema*, are generally highly toxic, highly infectious, and have a striking association with sequelae of all kinds. *The appearance of an erythema is probably a favourable sign.*
5. An infection due to a non-haemolytic streptococcus may have sequelae in no way distinguishable from those due to a haemolytic strain, whether there is an erythema or not.

If, as he says, these statements and conclusions are sound—and they have not been refuted so far—then it is pertinent to consider what alterations in, or modifications of, existing practice and teaching should be introduced.—Andrew W. Forrest, M.A., M.D., Ch.B. (Edin.), D.P.H., Scarlet Fever Control on Modern Lines. Presidential Address at a joint meeting of the Home Counties Branch and the Fever Hospital Medical Service Group, *Pub. Health*, 49, 12:413 (Sept.), 1936.

Standardization of Typhoid and Paratyphoid Vaccines*

I. The Value of the Gates Apparatus and Total Nitrogen Determinations

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THE multiplicity of methods proposed for determining the "strength" of bacterial vaccines indicates that all fall short in respect to one or the other of the two essential requirements, simplicity and precision. It usually happens that when simplicity is sought accuracy is sacrificed. When precision is demanded the method becomes complicated or cumbersome.

In principle, the methods proposed may be classified as those of:

1. Direct enumeration in a counting chamber
2. Indirect enumeration:
   (a) Wright's method
   (b) Colony count
3. Physical measurement:
   (a) Weight of dried bacteria
   (b) Volume of bacteria
4. Chemical measurement:
   (a) Total nitrogen determinations
5. Turbidity measurement:
   (a) Opacimetric
   (b) Nephelometric
   (c) Photometric
   (d) Photoelectric
6. Serologic measurement

No matter what method is adopted for standardizing vaccines the result is usually expressed in millions of bacteria per c.c. There is a growing feeling that this practice should be abandoned and that some other measure which more nearly represents the antigenic content should be adopted, because counts fail to take into consideration the size of organisms. Brown[1, 2] has proposed that the weight of the dried bacteria be substituted for the number of bacteria present, and has shown that the opacity of a bacterial suspension is intimately associated with the dried weight. Since antigens are very closely associated with proteins there is reason to believe that the total nitrogen of the bacteria might be an even better measure of the amount of antigen present. Mueller[3] has recommended the use of micro-Kjeldahl determinations for this purpose. Until there is some general agreement in regard to such a change, however, it seems more expedient to continue to express the bacterial content in numbers of bacteria.

Smith[4] in 1925 reviewed many of the papers dealing with methods of

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* Read before the Laboratory Section of the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 21, 1936.

standardizing bacterial vaccines and noted the general dissatisfaction with all methods then in use. He presented evidence of the marked inaccuracies of Wright's method and maintained that the direct count in the Helber counting chamber offered the most acceptable means of standardization. He admitted, however, that the results obtained varied with the observer and the technic used. Since the method is cumbersome and requires an average of several counts for accurate results, it has never come into general use. Most workers prefer to use the direct count for standardizing some simpler method which does not depend so much upon experience with the technic, dexterity, and constant practice.

The simplest and perhaps the most frequently used method is some means of determining the turbidity of bacterial suspensions. Holker[5] claims that measurements of opacity are subject to less variation than direct counts. Various kinds of standards have been proposed with which the opacity of the suspension to be standardized may be compared, some consisting of bacterial suspensions and others of insoluble inorganic substances in suspension. Baylis[6] has proposed a photometric method, and recently the photoelectric cell has been utilized for determining turbidities of bacterial suspensions. Most of these methods are subject to the criticism that they depend upon standard suspensions which change with age, and that therefore the standards must be re-standardized from time to time. Some also require complicated apparatus not usually available or readily kept in working order.

Gates[7] in 1920 recommended the disappearing loop as an instrument for standardizing vaccines. Holker[8] claims priority for the idea for Don and Chisholm.[9] Their apparatus was not strictly comparable to that proposed by Gates, nor did they claim to have originated it. They merely described a method which had been in use for several years for determining the turbidity of water samples but had not been applied to bacterial suspensions. Holker[8] states that he himself had independently worked out the method, but had discarded it in favor of an apparatus of his own design, which appears more cumbersome and probably no more accurate than the Gates apparatus. Some of the objectionable features mentioned by him have been eliminated by a modification described later in this paper.

The disappearing loop has been in use in this laboratory for several years for controlling the turbidity of vaccines for injection into horses. In addition to the advantage of having no standard tubes to deteriorate with age, it is useful because: (a) the apparatus can be assembled in any laboratory; (b) it is simple and easy to use; (c) experience with the apparatus is not of great importance; (d) the results obtained are quite accurate; (e) the size of the tube used is of little importance; (f) living cultures can be handled with ease and little danger.

During the time that this laboratory has been manufacturing typhoid-paratyphoid vaccine, one of the simpler methods (opacimetric) has been used to estimate the bacterial content of the three bacterial suspensions which are combined to make the triple vaccine. In comparing vials of triple vaccines made at various times it was noted that there was a considerable difference in opacity. An investigation was undertaken to determine the degree of variation and to find a method which would reduce it to a minimum.

The opacity of some of the monovalent vaccines prepared and standardized by the old method was determined with the Gates apparatus.

Typhoid vaccines supposed to contain 2,000 million bacilli and paratyphoid suspensions supposed to contain 3,000 million bacilli per c.c. showed marked differences in turbidity as gauged by corrected Gates readings.

Later in the study total nitrogen determinations by the micro-Kjeldahl method were undertaken. At that time the apparent variations in the bacterial content of the old lots of triple vaccines were confirmed. The total nitrogen of some lots was as low as 20 mg. per l., while others contained almost 60 mg.

The problem was to determine what corrected readings would represent 2,000 million or 3,000 million bacilli in these suspensions. This necessitated parallel corrected readings and direct counts on a number of vaccines, which were most easily made on experimental lots.

A MODIFICATION OF THE GATES APPARATUS

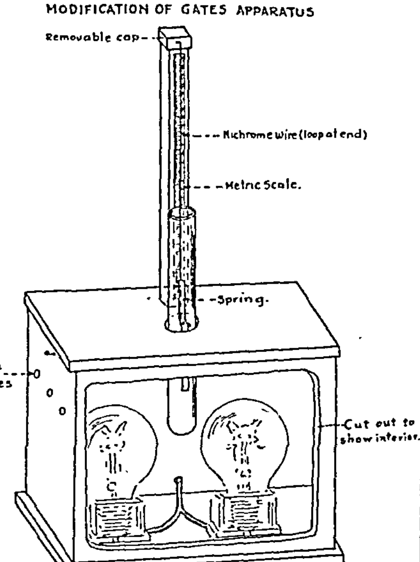
The original Gates apparatus consists essentially of a test tube holder with a sliding bar, calibrated in millimeters, to which is attached a nichrome wire loop. The method of use is simple, the loop being pushed under the surface of a bacterial suspension until it just disappears and the depth read off on the metric scale.

It was early discovered that consistent readings on the same vaccine were obtainable only under constant light conditions, otherwise readings made at different times of the day or on dark days and clear days are not within a satisfactory range. If a constant light is provided and all readings are made in a darkened room the readings are quite consistent.

The modified apparatus is a wooden box containing two 25 watt daylight bulbs. The inside of the box is painted with aluminum paint and the wires in the bottom are covered with a piece of white cardboard so that reflection will increase the evenness of the illumination. In the center of the top is a hole just large enough to admit a $\frac{3}{4}'' \times 6''$ test tube. Just behind the hole an upright, with an attached metric scale, is firmly fixed (Figure I). A piece of nichrome wire attached to a removable cap on the upright is bent down parallel to the metric scale and at a point even with "O" on the scale the wire is bent out at a right angle and a loop 3 mm. in diameter is formed so that it will be in the center of the tube when the bacterial suspension is in place for making a reading. A spring extending above and below the hole in the top of the box has enough tension to hold the tube securely at any level. The readings are made by observing the point on the metric scale opposite the top of the brightly illuminated meniscus. It will be noted that in the modified apparatus the tube is moved up and down until the loop disappears, whereas with the original apparatus the loop is moved up and down and the tube remains stationary. The electric bulbs are so mounted on each side of the hole through which the tube extends, and the holes for ventilation of the box are so placed, that no direct rays reach the eye of the observer.

FIG I.

MODIFICATION OF GATES APPARATUS



METHOD OF USING THE GATES APPARATUS

The cap, to which the wire supporting the loop is attached, is removed

TABLE I

TABLE OF DILUTIONS FOR MAKING SECONDARY READINGS WITH THE GATES APPARATUS

Reading on Primary Dilution	*Dilution for Secondary Reading*	*Actual Volumes in c.c. for 3/4x6 in. Tube*	
		Vaccine	*Saline*
1.0	1 + 16	1.5 +	24
1.1	1 + 16	1.5 +	24
1.2	1 + 13	2.0 +	26
1.3	1 + 13	2.0 +	26
1.4	1 + 10	2.5 +	25
1.6	1 + 10	2.5 +	25
1.7	1 + 8	3.0 +	24
1.9	1 + 8	3.0 +	24
2.0	1 + 6	4.0 +	24
2.1	1 + 6	4.0 +	24
2.2	1 + 5	4.0 +	20
2.3	1 + 5	4.0 +	20
2.4	1 + 4	5.0 +	20
2.6	1 + 4	5.0 +	20
2.7	1 + 3	7.0 +	21
3.4	1 + 3	7.0 +	21
3.5	1 + 2	9.0 +	18
4.2	1 + 2	9.0 +	18
4.3	1 + 1	14.0 +	14

from the apparatus and a tube containing the suspension to be standardized is inserted through the hole in the lighted box. With the loop inside the tube, the cap is replaced. The tube is raised slowly until the loop fades from view and its depth below the meniscus of the suspension is noted. Although the depth increases when the suspension is diluted the relation between the successive readings and the dilution is not inversely proportional, for reasons which are discussed in detail by Gates[7] and need not be repeated here.

By making two readings, one on the original suspension and another on a known dilution of the original, *corrected* readings can be computed which are inversely proportional to the dilution within certain ranges of opacity. These corrected readings are calculated by the following formula:

$$\text{Corrected Reading} = \frac{\text{Volume A (b} - \text{a)}}{\text{Volume B} - \text{Volume A}}$$

when "a" is the depth of disappearance in the original suspension; "b" that in the known dilution; Volume A the amount of the original suspension used in making the secondary suspension, and Volume B the total volume of the second suspension.

The formula is made unnecessary and the calculations are simplified if the dilution of the second suspension is expressed as 1 *plus* the volume added instead of 1 *to* the total volume (*e.g.*, 1 + 10 instead of 1 : 11). When this is done the calculations consist merely of dividing the difference between the two observations by the second figure indicating the dilution. The following example shows the simplicity of the calculations:

Original suspension, depth of disappearance	1.4 cm.
1 + 10 dilution of original, depth of disappearance	8.2 cm.
Difference	6.8 cm.

Corrected Reading: $6.8 \div 10 = 0.68$

POINTS TO BE OBSERVED IN USING THE APPARATUS

1. The depth of disappearance in the original suspension should always exceed 1.0 cm. When the suspension is too opaque, a dilution should be made on which to obtain the primary reading. The corrected reading obtained will now be that of the dilution, and in order to calculate the corrected reading of the original suspension it will be necessary to divide by the dilution factor. That is, if the dilution was 1:2 the corrected reading of the original will be ½ of that of the dilution.
2. Greater accuracy is obtained when the secondary suspension is as dilute as possible. Table I has been compiled from readings made in this study. It shows the best dilution to be used for the secondary reading when the original suspension has given primary reading.
3. When beginning observations it often takes a moment or two for the eye to become adjusted. A sufficient number of observations should be made so that 3 or more successive readings fall within a very close range.
4. Differences in visual acuity make slight but constant differences in the readings made by different individuals, so that it is well to

determine how closely the various persons taking part in standardizing vaccines will agree. These differences are minimized when the readings of two or three individuals are averaged.

5. As will be shown, the turbidity of bacterial suspensions decreases during heating, and also when standing in the presence of tricresol. It becomes stabilized rapidly after the tricresol is added, and there is little further change during the course of a year.

Preliminary Experiments — Because there was a tendency for the vaccines to clump on heating and subsequent centrifuging the first observations were made upon freshly suspended vaccines. It was soon discovered, however, that there was a considerable decrease in the count and turbidity after heating, centrifuging and contact with tricresol. For these reasons it was found advisable to delay standardization until after resuspending in salt solution containing tricresol. Moreover, when only smooth cultures were used in producing vaccines, clumping was minimized and more satisfactory counts were obtained.

Experimental Lots of Monovalent Typhoid Vaccine—Direct counts in the Helber counting chamber and corrected Gates readings were made on 23 experimental lots of vaccine produced from a smooth Rawlings typhoid strain, grown and handled in the manner used for routine lots. Each vaccine was made of the washings from 4 to 10 Blake bottles suspended in 40 c.c. of saline for each bottle. Counts and corrected readings were made on the vaccines when freshly suspended and after heating, centrifuging, and resuspending in salt solution containing 0.4 per cent tricresol. Only the observations on the resuspended vaccines are shown in Table II.

Corrected readings for 1,000 million bacilli were calculated for each of the 23 lots. Since counts and corrected readings are inversely proportional this consists of multiplying the observed corrected reading by the direct count and dividing by 1,000 million. The calculated corrected readings fall very close to the mean (3.48) of the 23. The variations from the mean would be much smaller if direct counts could be more accurately made. As many as 10 counts were made on some of the lots without getting close checks between them. The variations were often as large as 25 per cent.

Using a round number for the mean which errs slightly toward the more turbid side, a corrected reading of 3.40 can be considered as equivalent to 1,000 million typhoid bacilli. The counts indicated by the Gates readings were calculated on this basis for the 23 lots by multiplying 3.40 by 1,000 million and dividing by the corrected reading of each lot. In most instances the count predicted from the Gates reading corresponded very well to the direct count. The correlation coefficient between the two series is $+0.835 \pm 0.064$.

At this point in the study it was decided to include, as an additional check on the direct counts, total nitrogen determinations on these experimental vaccines.

Micro-Kjeldahl Determinations of Total Nitrogen—Attempts to make nitrogen determinations on the whole vaccine were not satisfactory. Amounts as small as 1 c.c. did not contain sufficient nitrogen to give accurate figures. It took several hours to evaporate the water from 5 c.c. and 10 c.c. samples and in addition duplicate and triplicate samples failed to agree. Mueller's [3] determinations are made on centrifuged bacteria. When this method was adopted, and 10 c.c. samples of the vaccines were centrifuged in the tubes in which digestion was to be done, determinations made on the sediment only gave good agreement between duplicate and triplicate samples. A surprising

TABLE II

DIRECT COUNTS, CORRECTED GATES READINGS, AND TOTAL NITROGEN DETERMINATIONS ON 23 EXPERIMENTAL LOTS OF MONOVALENT TYPHOID VACCINE

Lot Number	*Direct Count (Millions)*	*Corrected Gates Reading*	*Calculated Corrected Reading for 1,000 mil. Bacilli*	*Calculated Count for Corrected Reading of 3.4 (Millions)*	*Total Nitrogen (Milligrams per Liter)*	*Calculated Total Nitrogen for 1,000 mil. Bacilli (Milligrams per Liter)*	*Calculated Count for 22.5 Milligrams of Nitrogen (Millions)*
TE22	13,000	0.280	3.64 [1]	12,300 [2]	272	20.9 [3]	12,000 [4]
TE23	11,000	0.315	3.47	10,700	243	22.1	10,800
TE24	13,000	0.280	3.64	12,300	292	22.5	13,000
TE25	8,500	0.375	3.18	9,100	196	23.1	8,700
TE26	10,100	0.315	3.19	10,700	259	25.6	11,500
TE27	12,000	0.295	3.54	11,500	257	21.5	11,400
TE28	14,200	0.270	3.81	12,600	288	20.4	12,800
TE29	10,700	0.315	3.38	10,700	247	23.1	11,000
TE30	10,900	0.300	3.27	11,300	244	22.4	10,800
TE31	10,900	0.290	3.17	11,700	260	23.9	11,500
TE32	10,700	0.335	3.58	10,200	237	22.2	10,500
TE33	11,000	0.345	3.79	9,800	214	19.9	9,500
TE34	10,400	0.300	3.12	11,300	225	21.6	10,000
TE35	9,700	0.330	3.21	10,300	220	22.7	9,800
TE36	10,000	0.325	3.25	10,500	243	24.3	10,800
TE37	10,600	0.330	3.51	10,300	226	21.3	10,000
TE38	9,500	0.419	3.97	8,100	189	19.9	8,400
TE39	11,600	0.335	3.87	10,200	242	20.9	10,800
TE40	10,400	0.342	3.55	9,900	209	20.1	9,300
TE41	11,100	0.330	3.66	10,300	245	22.1	10,900
TE42	11,800	0.298	3.52	11,400	270	23.9	12,000
TE43	9,500	0.335	3.18	10,200	228	24.0	10,100
TE44	8,000	0.440	3.52	7,700	177	22.1	7,900
			Mean = 3.48			Mean = 22.2	

1. $\frac{13{,}000 \times .280}{1000} = 3.64$

2. $\frac{3.4 \times 1000}{.280} = 12{,}300$

3. $\frac{1000 \times 272}{13{,}000} = 20.9$

4. $\frac{272 \times 1000}{22.5} = 12{,}000$

fact was that the figure obtained in this way was usually as large, and sometimes even larger, than that obtained on the whole vaccine. The loss with the whole vaccine apparently occurs because a portion of the nitrogen is carried off with the vapor during the process of evaporation before digestion begins.

The figures given in this paper represent the total nitrogen of the bacilli only. It must be borne in mind that there is an additional 10 to 20 per cent of nitrogen in the supernatant.

Total nitrogen determinations (Table II) were made on each of the above experimental typhoid vaccines. The total nitrogen for 1,000 million bacilli was then calculated for each lot, the mean of the series being 22.2 mg. per l. Again using a round number toward the more concentrated side, a total nitrogen of 22.5 mg. can be considered as equivalent to 1,000 million bacilli. The counts indicated by nitrogen determinations were calculated on this basis for the 23 lots by multiplying the total nitrogen by 1,000

TABLE III

CORRECTED GATES READINGS, COUNTS, AND TOTAL NITROGEN DETERMINATIONS ON 26 ROUTINE LOTS OF MONOVALENT TYPHOID VACCINE

				Counts		
					Counts Estimated from	
Lot No.	*Corrected Gates Reading*	*Total Nitrogen (Milligrams per Liter)*	*Calculated Corrected Reading for 22.5 Mg. Nitrogen*	*Direct Counts*	*Corrected Reading*	*Total Nitrogen*
182A	3.05	23.8	3.23	990	1,120	1,060
182B	3.12	24.4	3.39	....	....	....
182C	3.15	23.8	3.33	....	....	....
182D	3.15	24.7	3.46	....	....	....
183A	3.12	24.4	3.37	....	....	....
183B	2.98	24.0	3.16	950	1,140	1,070
184A	3.45	20.8	3.18	795	990	925
184B	3.45	21.5	3.29	....	....	....
184C	3.93	17.3	3.02	....	....	....
185A	1.68	49.0	3.66	1,990	2,020	2,180
185B	1.75	43.7	3.39	....	....	....
185C	2.00	35.3	3.14	....	....	....
185D	3.05	24.8	3.37	....	....	....
186	1.48	48.2	3.17	2,190	2,290	2,140
187A	1.68	49.0	3.66	1,830	2,020	2,180
187B	2.00	38.4	3.41	....	....	....
187C	2.00	36.8	3.27	....	....	....
188A	1.85	46.0	3.78	....	....	....
188B	1.79	46.7	3.72	....	....	....
189A	1.80	47.0	3.76	2,210	1,890	2,090
189B	1.58	47.5	3.33	2,220	2,150	2,110
189C	1.45	50.0	3.22	2,460	2,340	2,220
189D	1.35	53.5	3.22	....	....	....
189E	1.60	47.8	3.40	....	....	....
190A	1.45	49.7	3.21	2,310	2,340	2,210
190B	1.55	51.4	3.54	2,225	2,190	2,280
			Mean = 3.37			

million and dividing by 22.5. Again the counts predicted corresponded very closely to the direct counts. The correlation coefficient between the two series is $+0.843 \pm 0.060$. It will be noted that the counts estimated from the corrected readings and those from the total nitrogens run more closely parallel to each other (correlation coefficient: $+0.937 \pm 0.025$) than either estimate does to the direct count, which would indicate that both of these measures are more consistent than the direct count.

Application in the Standardization of Routine Lots—When the floods of the past spring required the rapid production of large quantities of typhoid vaccine, the figures on the experimental lots had just been accumulated. Corrected Gates readings were therefore substituted for the opacimetric method previously employed for standardizing monovalent vaccines to contain the desired number of bacteria. Total nitrogen determinations were then made on these diluted vaccines and a few direct counts were made. Table III gives the figures on 26 routine lots made at that time. The calculated corrected readings for 22.5 mg. of nitrogen fall within a satisfactory range from the mean.

Counts were estimated from both the

corrected reading and the total nitrogen for each lot on which direct counts were made. Again it will be noted that these estimates run more closely parallel to each other than either estimate does to the direct count. Estimates were made for the remaining lots and the correlation coefficient between the two series computed. In this case the correlation between the counts indicated by the corrected readings and those indicated by the total nitrogens was $+0.979 \pm 0.008$.

The first 9 lots were intended for distribution as monovalent vaccine during the emergency and were standardized as soon as prepared at 1,000 million bacilli. Because the turbidity had not become stabilized, they could not be adjusted exactly to a corrected reading of 3.4, an allowance for a decrease in turbidity being necessary. All the readings in Table III are those made several days after standardization. An error in calculation of volumes caused Lots 184A, B, and C to be diluted too much.

The remainder of the lots were also standardized as soon as resuspended, but were meant to contain 2,000 million bacilli (corrected reading of 1.7). If these suspensions could have been set aside until the turbidity became stabilized, they could have been more accurately standardized. Most of the lots contained more than 2,000 million bacilli. This was intentional as more salt solution can be added to bring up the volume when mixing with the paratyphoid fractions of the triple vaccines. Since a year's supply of vaccine was accumulated by the end of the emergency, no observations on additional lots have as yet been made.

The Standardization of Monovalent Paratyphoid Vaccines—Because our *B. paratyphosus* A culture is slightly smaller than our smooth Rawlings typhoid strain and our *B. paratyphosus* B culture is very much larger, the same corrected reading cannot be used in standardizing them. We plan to obtain a smooth culture of each more nearly of the same size as the typhoid strain before accumulating a series of observations on experimental lots of vaccines made from them. Meanwhile we are standardizing them by total nitrogen determinations.

DISCUSSION

Our experience with the Gates apparatus has convinced us that the method is as accurate for routine use in standardizing bacterial vaccines as direct counts. Since this is so, the simplicity of the method should cause its wide adoption in the standardization of bacterial suspensions of all kinds. Usually it would be necessary to do parallel counts or total nitrogen determinations on only a few vaccines made with a particular organism to determine the corrected reading corresponding to the bacterial content desired.

When it was determined that 1,000 million typhoid bacilli represented a total nitrogen of about 22.5 mg. per l., it was apparent that many lots of vaccine which had been distributed contained fewer than the labeled 2,500 million organisms per c.c. Only an occasional lot had contained the estimated amount of nitrogen ($2.5 \times 22.5 = 56.25$) for that number of bacilli. To push up the bacterial content suddenly did not seem advisable. Lots have therefore been standardized for the time being to contain about 2,000 million bacilli (45 mg. N.). A questionnaire was sent recently to a number of state institutions where large numbers of patients are routinely given these vaccines. Replies indicated that reactions during the last few months had not increased in frequency or severity with the increase in bacterial

content. Two complaints had been sent to us just before the questionnaire was sent out. In one instance the lot used contained 58.7 mg. N. per l.; the second contained less than 40 mg. N. Unless undesirable reactions begin to be reported, the bacterial content of the triple vaccine will be increased from time to time until it contains the labeled 1,000 million typhoid bacilli and 750 million of each of the paratyphoids.

SUMMARY AND CONCLUSIONS

1. A modification of the Gates apparatus, which increases its accuracy, is described.
2. This modified Gates apparatus offers a simple and accurate method of standardizing bacterial vaccines.
3. When a typhoid vaccine made from a smooth Rawlings strain is standardized at a corrected Gates reading of 3.40 the likelihood of its containing exactly 1,000 million bacilli per c.c. is as great, if not greater, than if it is standardized by direct count.
4. The total nitrogen of the centrifuged bacilli from such vaccines, standardized at a corrected Gates reading of 3.40, is very close to 22.5 mg. per l.

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Rejuvenation Theories Biologically Unsound

I AM quite sure that we shall overcome all those causes of sickness which can be overcome by the full exercise of the powers we possess, or which further research may give us, but I see no warrant whatever for supposing that we can prolong human life indefinitely or that we can overcome the infirmity of age.

It seems to me that the favourable interpretation which some have placed on experiments in tissue culture and the results of researches into endocrine functions, indicating the possibility of rejuvenation, is biologically unsound, though I am prepared to admit that they do offer a hope that we may arrange human ageing to be more regular and so diminish the numbers which die from irregular deterioration of their organs.—Dunstan Brewer, D.P.H., *Ann. Rep., Medical Officer of Health for the Year 1935*, Borough of Swindon, p. 6.

Mental Hygiene in Public Health*

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WHAT is mental hygiene? What can we hope to accomplish in the way of preventing mental disorder? What content is available for the formal presentation of mental hygiene principles and practices? Where should the emphasis be placed in developing more adequate and widespread constructive attitudes to mental disorder and mental health? To whom or to what groups does the responsibility for the promotion of mental health and prevention of mental disorder fall?

These and other questions are being persistently presented from the field of public health and preventive medicine to specialized workers in the field of mental health. They seem to be indicative of the growing realization for the necessity of including mental health considerations in public health programs. I hope they indicate a realization that mental health is not separate and apart from physical health. Health, physical and mental, represents one single complex state of adjustment.

When a physician with broad representative interests in the fields of public health and preventive medicine, with evident interest in finding an answer, issues the challenging question: " Now, just what is mental hygiene? " —what shall we say? Perhaps we are justified in countering with: " What is preventive medicine? " The counter question is not one way of evading the original query. It actually implies the answer because the principles which have applied in the field of preventive medicine are exactly the principles which must apply in any program to promote mental health and prevent mental disorder.

On the basis of our present knowledge of how the individual grows and the factors in his routine and environment which favor healthy physical growth, of how he responds satisfactorily or fails in the face of certain environmental hazards, this knowledge together with some understanding of individual constitutional factors, represents the basis upon which the present program for insuring healthy physical growth and avoiding physical disease has been established. Health programs have proceeded:

1. To provide so far as is possible the positive factors which favor adequate growth
2. To simplify the environment by the removal of certain hazards
3. To build up the resistance of the individual through establishing specific immunities to certain other hazards.

Through general educational measures larger and larger groups in the community have been acquainted with the principles and factors which make for

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healthy growth and the means to be taken to avoid sickness.

If for the moment for the purpose of convenience in this discussion, we might consider mental health apart from physical health, exactly the same principles and practices are applicable for the promotion of mental health and the prevention of mental disorder. As to how we shall proceed, this must depend upon:

1. What we now know or may learn about mental growth and the nature and causes of mental disorder
2. How far we can evolve from this knowledge, adequate mental health principles and practices
3. How far we can effect a satisfactory integration of these principles and practices in public health and medical programs

Mental health implies an adequate relationship as between the individual and, reality in the form of experiences, reality as it exists outside the individual in his physical and social environment, and reality as it exists within himself in the terms of his own feelings, thoughts, desires, drives to action, assets, and limitations. Mental disorder, when it occurs, represents as does physical disease, some failure of the individual in relation to experience, with exactly comparable evidences of dysfunction and distortion or arrest of normal growth. The individual becomes what he does by virtue of his inherited constitutional make-up together with what goes forward in the way of growth. What the individual inherits, on either the physical or the mental constitutional aspects, are "potentials for growth." So far as we know he does not inherit mental disease as such nor the attitudes and personality characteristics which we see manifested in his later behavior. He inherits potentials which in the course of experience are developed and modified to produce what we later find in the way of personality adjustment.

Apart from the general health measures for the elimination of the physical factors, organic and toxic, which are accompanied by disturbed mental functioning, there is only one major gateway to mental health and that is through mental growth. Mental growth represents just as definite and orderly a process as does physical growth. Adequate mental growth implies a progressive re-distribution of interest-energy from self to outside interests. In the course of this process there must take place a progressive re-placement of infantile self-values and infantile sources of satisfaction by more adult social values and adult satisfactions. That is, this forward-going process involves a continuous relinquishing of values which are normal for one phase of development in favor of the values which we recognize as normal for a later period. Self-interest of course is maintained throughout life as perhaps the principal motivating factor for activity. The healthy mature adult, however, finds his self-satisfactions largely in terms of interest and effort directed away from himself rather than in terms of the naïve, dependent, demanding self-values of the infant. On the other hand, the emotionally immature adult, has retained in his values much of the infantile dependent quality which demands a great deal in the way of ministration and attention to his immediate needs which blocks his ability to get satisfaction out of independent effort and which is impatient of any thwarting or delay in securing his objectives.

The person who is not reasonably mature from an emotional standpoint is essentially a poor mental health risk. There is a lack of essential adult satisfactions, an underlying feeling of inadequacy in relationship to his fellows which determines an inadequate response to any sort of critical experi-

ence in the form of disappointments or deprivations or in the face of demands for unusual effort. One sees clinical evidences of inadequate maturity at all chronological levels and we must have standards and criteria available to enable us to determine in any cross-section the adequacy and the significance of the personality responses which we observe.

Today I have seen a man of 45—a man with fine intellectual capacity, holding an important executive position in business but responding in a way which is habitual for him, in the face of difficult or disappointing situations. He has been in bed for over a month following a slight influenzal cold. He berates the inefficiency of his physicians because they tell him that his lungs and heart are all right. He stresses his difficulty in breathing, his general weakness, but on the other hand he is being ministered to as completely as he was when he was 6 months old.

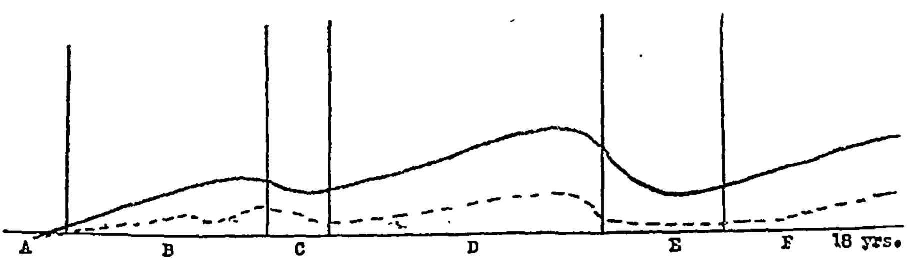
In this same clinical day I had seen a man of 42 who, in the past 6 or 8 years, has been described as a manic-depressive person. There have been periods of extravagant, hypomanic activity leading to indiscretions in behavior, over-indulgence in alcohol, social and business indiscretions. These periods have been followed by depressive phases in which he is exaggerating his feelings of inadequacy and using these feelings as a way of avoiding what he feels are onerous and difficult responsibilities. In this particular problem it does appear that the mental disorder is not in response to constitutional biological factors, but that we are dealing with a person who is emotionally immature, whose infantile self-values have been so completely maintained and reinforced by over-protection during the developmental years, that he is quite unable to accept with satisfaction the responsibilities which adult life has brought. Over a period of 17 or 18 years he has used his domestic situation in an attention-getting, bolstering way, but all the time with an underlying discontent and dissatisfaction with what he vaguely has realized were inadequate responses. This patient's reaction to the breaking up of the domestic situation has been a further depressive episode in which, instead of being able to crystallize the situation and recognize his responsibilities, he spends his time bewailing his own lack of fitness, his inability to accept his business responsibilities and make decisions, his discomfort in having to face his daily routine and social obligations alone. He is like a child in his helplessness, crying for a lost lollypop but unable to make any constructive effort to fill in the gap.

The process of progressive re-distribution of interest-energy and the replacement of infantile values goes forward satisfactorily, given reasonably favorable conditions, just as physical growth proceeds under comparable reasonably favorable conditions. The period of infancy and preschool growth is tremendously important as the foundation for later healthy mental development. The parent is the strategic person in either promoting or inhibiting an early healthy mental growth process. One can hope for a gradual progressive learning of new ways of finding satisfaction and the progressive replacement of values from period to period during growth, only under conditions which permit a reasonable freedom for independent activity and experimentation.

Interference in the form of overprotection, over-solicitous and fearful attitudes for the growing child, unwise emphasis and conflict over health routines, repressive discipline, all tend to reinforce infantile self-values and

prevent adequate growth in the direction of emotional independence, emotional self-control and intellectual progress as these increments in growth and learning are marked by increasing self-confidence and fortitude in the face of difficult situations and disappointments, patience in the face of failure and thwarting and the acquiring of satisfying new skills and knowledge. The individual learns and grows by doing. If his spontaneous expression and experimenting is thwarted through repressive interference of whatever kind, or if his satisfaction from his own effort is consistently overshadowed by adult approbation or disapproval, there is a maintenance of infantile values and forms of satisfaction which does not promise well for a later healthy independent adjustment and a satisfactory, satisfying assumption of adult responsibilities.

The best single criterion which we have for healthy mental growth is in terms of this progressive re-distribution of interest-energy and in cross-section at any chronological level; our best single criterion for mental health is in terms of how completely the individual's interests and energies are distributed constructively, that is, in ways which are personally satisfying and socially acceptable. When we find individuals who, on the one hand, are behaving in ways which are ineffective and socially unacceptable or, on the other hand, whose behavior responses and interests lack reasonable balance and diversity—even though they be essentially acceptable—we should recognize the fact that we are dealing with persons who do not represent good mental health risks and in whom, given reasonable potentials, mental growth toward an adequate balance and adjustment, has not proceeded satisfactorily.



——Curve showing ideal normal distribution of interest-energy in personally satisfying, socially acceptable ways.

----Curve showing unhealthy distribution of interest-energy, where interest remains too closely related to infantile self—marked by such behavior characteristics as

Dependency, sensitiveness, emotional instability, day dreaming, fearfulness, shyness. and later Fears, phobias, feelings of inferiority, hypochondriacal complaints, social isolation, etc.

A—Infancy, early self-centered, auto-erotic period.

B—Pre-school period.

C—Transition period between home and larger social group, represented by school.

D—Pre-adolescent period.

E—Puberty—later auto-erotic period. Marked by self-consciousness, sensitiveness, slump in outside activities and performance, *e.g.*, school performance, and determined by physical changes of period.

F—Later adolescent years, with redistribution of interest to outside things—social interests, recreational and vocational interests, mating or hetero-sexual interests.

The emphasis of the public health program must be on the growth process, insuring so far as is possible conditions under which growth may proceed in a healthy fashion. The integration of a mental health approach implies that the personnel of health departments shall be familiar with: (a) the way in which mental growth proceeds; (b) the factors which favor and the factors which interfere with healthy mental growth; (c) behavior responses at all points in the developmental period or in the adult periods which suggest significant deviations from healthy mental growth or mental health; (d) the place of inheritance in relationship to mental disorder since much of the general public's fear and misunderstanding of mental disease is based on misconceptions of the part played by heredity; (e) the laws of learning. Inasmuch as it is impossible to project an adequate program of health education without some knowledge of how learning takes place, the emotional factors which are involved, the satisfactions, resistances, and fears which are aroused in the presentation of new material, and the adjustments of which are more important than the simple acquirement of new facts. For example, around such learning as has to do with the establishment of health habits in relationship to such functions as eating, sleeping, and elimination—public health teaching, in its desire to see these habits established for the growing child, has emphasized their importance to the point that a destructive over-concern and anxiety has been set up in the minds of parents.

In public health teaching we have frequently overlooked the learning principle that an accompanying emotional satisfaction is an essential for all good learning. The parent, in expressing anxiety and in the urgency to secure adequate health habits, may make around this training a battleground which not only defeats the immediate purpose of the teaching but which is a seriously interfering factor in other aspects of mental growth. Again because of their own unresolved conflicts, parents and other adults are frequently quite unable to use in a reasonable fashion the factual material which we might include in a health program. We have recognized in our approach to parent education or teacher education, the importance of helping these adults to some re-adjustment of their own attitudes and misunderstandings rather than just being satisfied with handing them factual information which they may or may not be able to use wisely.

SUMMARY

In this rather general presentation, dealing with the integration of mental hygiene in a public health program, I have attempted to indicate that:

1. Any program of public health and preventive medicine to be adequate must approach its problem with the premise that physical and mental aspects of health represent one single complex state of adjustment. That the individual in all his responses is a "reacting whole." Any program of therapy or prevention which does not adapt this approach lacks effectiveness and balance in much the same way as a boxer with one hand out of action.

2. The approach to mental disease prevention does not differ in any respect from the approach to general health and preventive medicine.

3. The emphasis in any program for mental health must be on safeguarding the "growth process." In guiding the process of mental growth, our objectives are: (a) emotional maturity in terms of emotional independence and emotional self-control; (b) intellectual maturity. Failure in securing through growth an adequate degree of emotional maturity leaves us with individuals who are poor mental health risks.

4. The public health group at the moment is in a vulnerable and at the same time in a strategic position. They cannot afford to

overlook an aspect of health effort as inclusive as that to which they have been giving the major part of their attention—at the same time they are in a position to make a contribution which promises more in the way of returns, over the next decade, than perhaps any other development in the social or medical fields.

The Impact of Science Upon Society

. . . But not alone economics: if the impact of science brings certain evils they can only be cured by more science. Ordered knowledge and principles are wanted at every point. Let us glance at three only, in widely different fields: man's work, man's health, man's moral responsibility. The initial impact of new science is in the factory itself. The kind of remedy required here is covered by the work of the National Institute of Industrial Psychology. Some of this improves upon past conditions, some creates the conditions of greater production, but much of it combats the evils arising from new conditions created by modern demands, speed, accuracy, and intensity. It invokes the aid of many branches of science. It is the very first point of impact. Yet its finance is left to personal advocacy, and commands not 10 per cent of the expenditure on research in artificial silk, without which the world was reasonably happy for some centuries. We can judge of the scope of this by the reports of the Industrial Health Research Board. Again, the scientific ancillaries of medicine have made immense strides. Clinical medicine as an art makes tardy, unscientific, and halting use of them. The public remains as credulous as ever, their range of gullibility widened with every pseudo-scientific approach. (We do not know what proportion of positive cases can create the illusion of a significant majority in man's psychology, but I suspect that it is often as low as 20 per cent.) For a considerable range of troubles inadequately represented in hospitals, the real experience passes through the hands of thousands of practitioners, each with too small a sample to be statistically significant, and is, therefore, wasted from a scientific standpoint.

Half-verified theories run riot as medical fashions, to peter out gradually in disillusionment. If the scattered cases were all centralized through appropriately drawn case histories, framed by a more scientifically trained profession, individual idiosyncrasy would cancel out, and mass scrutiny would bring the theories to a critical statistical issue of verification or refutation in a few months. This would be to the advantage of all society, and achieve an even greater boon in suggesting new points for central research.—Sir Josiah Stamp, The Impact of Science Upon Society, *Science,* Sept. 11, 1936, p. 239.

Recent Advances in the Control of Pneumonia*

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WITHIN the lifetime of the older members of this audience one of the principal causes of death in the English bills of mortality was "fever." Under this term were included not only typhus and typhoid fever but probably also many cases of meningitis and miliary tuberculosis, to say nothing of the various forms of paratyphoid, dysentery, and other acute infections of the intestinal tract. Although some progress in the prevention of certain of these diseases had been made before an etiologic classification was possible, it was only following the discovery of the causal agents that there occurred the great advances in prevention that are now hailed as triumphs of modern organized public health.

In the light of what has been accomplished in the control of the so-called intestinal infections, it is astonishing that almost no effect has been produced on the prevalence of acute respiratory diseases or on the associated mortality. Indeed, notwithstanding the vast army of health workers that has been mobilized to fight disease, and the expenditure of enormous sums of money for public health, there occurred only a few years ago, the greatest pandemic of acute respiratory disease that the world has ever seen, with an unprecedented loss in human lives. Each year in many regions there now occurs a greater loss of life from acute pulmonary infections than ever resulted from typhoid fever, even in the worst epidemic periods.

These facts deserve the most serious consideration of those guarding the health of the people. Is this condition due to lack of knowledge, to the indifference of health authorities, to ignorance of physicians, or to all of these factors combined?

In my opinion, a most important obstacle to progress in this field has been the employment of the term "pneumonia," which implies a specific infectious disease, but which really covers all forms of inflammation of the lungs. So long as "fever" was a reportable disease, no progress could be made in preventing typhoid and allied conditions. So long as the attempt is made to control "pneumonia," the results are bound to be futile.

For pneumonia is not one disease but is a group of diseases, each with a specific etiology. General sanitary measures could have and did have some effect in the prevention of diseases like typhoid and typhus. We know of no such measures that can influence acute infections of the respiratory tract, and all the efforts to decrease the prevalence of dust, to

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diminish crowding, to prevent sneezing, to lessen susceptibility by consuming vitamins, by avoiding fatigue or overdrinking, have had little or no effect. The attack must be directly or indirectly on the specific infectious agents themselves.

As long as it was believed that pneumonia was due to pneumococcus, an organism widely distributed in nature, present in the mouths of the healthy as well as the sick, the problem indeed seemed hopeless. What could be accomplished in the way of prevention of intestinal infections if typhoid bacilli, all the paratyphoid bacilli, and the various kinds of dysentery bacilli were considered identical, and also identical with the colon bacilli inhabiting the intestinal tract of healthy persons? As a matter of fact all these microörganisms *are* closely related in form and function, and very careful laboratory procedures are required to differentiate them. The discovery, therefore, that pneumococci are not all alike, that there are a number of varieties and that those causing the most serious and most common forms of acute lung disease are not widely distributed, was of great significance.

A second great obstacle to advance in this field was raised during the last century following the development of pathologic anatomy and the introduction of methods of auscultation and percussion, when a classification of acute pulmonary disease on an anatomical basis was attempted, and the recognition of the various forms by the methods of physical diagnosis became the chief interest of physicians. If all the time that has been spent by doctors in efforts to determine the exact portion of the lungs involved in cases of acute pulmonary infections had been spent in detecting the etiologic agents concerned, many lives might have been saved. Even pathologists with the tissues before them, are in many cases unable to say whether the condition from which the patient suffered was broncho or lobar pneumonia. From the public health standpoint these anatomical diagnoses are not only useless but are misleading, for within very recent years in the English mortality tables the deaths ascribed to bronchitis are almost as numerous as those in which the diagnosis is pneumonia. A second great advance has been made, therefore, by the discovery of methods by which the causal agent in every case can be readily determined and the cases thus classified etiologically. It happens that these methods involve laboratory procedures, but let us remember that typhoid fever and the various forms of paratyphoid can also be differentiated only by laboratory methods.

It is impossible today to discuss in detail the matter of terminology, though this is of much significance, for as Faber has said, the physician "cannot live, speak, or act without the concept of morbid categories" and, we may add, no more can the public health worker. Even if it were desirable, it would be impossible to overthrow entirely the terminology now in use, but it would add greatly to progress if the term "lobar pneumonia" were confined to the designation of those cases of acute lung infection which present the clinical features that have been considered characteristic, and in which the etiologic agent is pneumococcus. The particular variety of the disease may then be designated by the type of pneumococci concerned and Type I pneumonia becomes the name of a definite and specific disease, as specific as is typhoid fever. Since Type I pneumonia and Type II pneumonia together constitute 60 per cent or more of all cases of lobar pneumonia, they present the outstanding immediate

problem as regards control of this group of diseases.

A further great advance in knowledge has consisted in the discovery that not only can animals be highly immunized against pneumococci of the same specific type, but that the serum of these artificially immunized animals, when injected into susceptible ones, may render the latter resistant, and still more important, if injected promptly and in large amounts into animals that have already been infected will cure them.

Another advance in knowledge has consisted in the discovery that pneumonia is rarely a primary disease. During the World War when acute respiratory diseases were so prevalent, it was found that most cases of pneumonia followed or were associated with measles or influenza. Experience since then indicates that in most cases of pneumonia the onset is preceded by a cold of longer or shorter duration, or by influenza-like symptoms. The sudden onset of pneumonia in a person previously perfectly well is only another textbook fairy tale; in my experience it rarely happens in real life.

Dochez and his collaborators have shown that colds, at least those of certain varieties, are due to filterable viruses, and Laidlaw and Andrews in England, and Francis in this country have similarly presented evidence indicating that filterable viruses are also responsible for influenza, at least for that occurring in interepidemic periods. Francis has also developed methods by which active immunity in man to the influenza virus can probably be produced.

Now, how can all this new knowledge be used in attempts to lessen the ravages of acute pulmonary infections? The first step in all efforts of this kind must consist in detecting and diagnosing each individual case and thus determining the frequency of occurrence of cases of the various kinds. Paraphrasing a remark of Benjamin Wood, " Pestilence must not walk in the dark. It must be measured and registered and walk at last in the open day." The methods for accomplishing this in the case of the acute respiratory diseases are now available. It remains for physicians and public health authorities to employ them.

Efforts at prevention may be directed toward the chief predisposing factor, in this case the preceding upper respiratory infection, or toward limiting the spread of the infectious agent itself, or, in lieu of this, rendering the population immune by means of artificial immunization. While the discoveries that colds and influenza are due to filterable viruses, are of great significance, methods for applying this knowledge in the prevention of these conditions have not yet been established.

It is possible, however, to prevent the spread of pneumococci from the sick to the well, at least in Type I and Type II pneumonia. It is now known that organisms of these types are not widely distributed. They are present in the mouths only of those suffering from pneumonia of the respective types except occasionally in the mouths of persons closely in contact with these patients, and then for only short periods of time. They may also occasionally be isolated from objects in the immediate surroundings of patients, or from the dust of rooms occupied by them. These facts and the results of studies of family and local epidemics indicate that Type I and Type II pneumonia are usually spread by direct transfer of the infective agent from the sick to the well.

Prevention of the spread of typhoid was long delayed by insisting that typhoid fever was an infectious, but not a contagious, disease. We must begin

to recognize that Type I and Type II pneumonia also are contagious diseases. It is true that isolation of patients has not been the measure principally responsible for the prevention of intestinal diseases; yet it is possible to limit and even stop the spread of typhoid fever by early diagnosis, isolation of patients, and careful disposition of all excreta. This was clearly demonstrated by the State Board of Health in Michigan in 1901, and by Koch in early studies carried out in Trier. More than 20 years ago at the Hospital of the Rockefeller Institute we began isolating all cases of pneumonia, disinfecting all sputa and other excreta, and insisting that doctors, nurses, and all persons coming in contact with these patients wear masks and gowns. It is not likely that masks form an effective barrier to the spread of infection, but they serve as a constant reminder to everyone that at least certain kinds of pneumonia are acute, specific, infectious, contagious diseases.

At present no conclusions can be drawn with regard to the effectiveness of artificial immunization. Few extensive experiments have been made with this method and they have been complicated by extraneous factors. The outlook in this direction is by no means hopeless but at the present time the chief reliance in the field of prevention must be placed on isolation of the patients.

On the other hand, it is now quite certain that much may be accomplished in reducing mortality from the severe pulmonary infections by suitable treatment. In the hospital with which I am associated, we have studied during the past 25 years, practically all forms of nonspecific treatment which offered any prospect of being valuable. Certain measures, such as the administration of oxygen and drugs to relieve special symptoms, have been found valuable, but even if employed with all possible skill, it does not seem that they can have a very marked effect in reducing mortality rates.

The situation is quite different, however, as regards specific treatment. During 1911 and 1912 extensive clinical and experimental studies on pneumonia were conducted in the Hospital of the Rockefeller Institute. It became evident that serum treatment of Type I pneumonia would probably be useful, provided the serum were given early and in large amounts. A horse was immunized against Type I pneumococci and serum was collected. On January 18, 1913, Ernest Schaffhouser, a sailor suffering from Type I pneumonia of 2 days' duration, was admitted to the hospital. The same day at 2:30 in the afternoon, 100 c.c. of the immune horse serum were injected into a vein of his arm. Two hours later he said he felt much better; the symptoms were obviously improved. Eight hours after the first injection he was given a second one of the same size. The next morning his pulse and temperature were normal; he was well. To make the cure certain he was given a third similar injection. Twenty-three years ago this was heroic treatment!

From that day to this practically every patient suffering from Type I pneumonia admitted to this hospital has been treated with serum, always insisting that the serum be type specific, that it be given as early as possible, and that it be administered in large amounts. In certain other places various subterfuges have been employed in order to avoid strict adherence to these principles. Serum has been given in small doses; it has been given indiscriminately to patients with pneumonia regardless of type; polyvalent serum has been used; great efforts have been made to reduce the amount of fluid injected, by employing

extracts or concentrates said to be 20 or 30 times as active as whole serum. In spite of all these substitutions and neglect of the underlying principles, however, convincing evidence has gradually been accumulated by various observers which shows that Type I serum is curative, and fortunately the day has now passed when it is necessary to urge this point.

It is not sufficient, however, that patients be simply treated by the administration of Type I serum; of great importance is how they are treated. As the animal experiments indicated, treatment should be commenced early, and prompt diagnosis is therefore of great importance. In my opinion physicians have made the diagnosis of pneumonia too difficult. They too frequently wait for the physical signs of consolidation to appear. As a matter of fact, to the experienced observer, the symptoms at the onset of the disease are almost pathognomonic. Most patients *threatened* with pneumonia *have* pneumonia. When, either with or without preceding respiratory symptoms, the patient has a chill, fever over 102°, cough, sharp pain in the chest, rapid respirations, and above all when the sputum is blood tinged, this person in the great majority of cases, has pneumonia. In all such cases the sputum should be examined without delay, and if pneumococci are present, particularly if they are of Types I or II, there can be little doubt about the diagnosis.

The laboratory worker should consider the examination of the sputum an emergency measure. It should not be delayed until the next morning or until other work is out of the way, and the physician should be notified by telephone or telegram immediately after the diagnosis is made.

As soon as it is determined that the patient is suffering from Type I pneumonia, serum should be administered. There should be no waiting to see whether the patient will not be better in the morning; it should not be delayed because he does not seem sick enough to justify giving serum; or it should not be decided that "it is too late," that "he is too far gone for serum to be of any use."

The only exceptions we have made in administering serum have been in an inconsiderable number of children who were not very ill, since most children with lobar pneumonia recover; second, in patients who were moribund on admission and died before the serum could be administered; and third, in patients who were obviously in the stage of recovery when admitted.

All other cases have been treated as soon as the diagnosis was made. This is of importance because some of those employing serum have recommended that it be used only in cases that can be treated as early as the 3rd or possibly the 4th day. It is true that the earlier in the disease it is used, the greater is the effectiveness of the serum, but our experience indicates that no patient, however late he is seen, should be deprived of the benefits of this measure. In our series, the mortality rate in cases treated during the first 3 days was 4.8 per cent, in those treated on the 4th day or earlier, 8.2 per cent, on the 5th day or earlier, 8.6 per cent, and in those treated after the 5th day 19.5 per cent.

Until 3 years ago, whole serum in doses of 100 c.c. was administered; since then concentrated serum has been employed, not in doses of a few c.c., but in 15 to 30 c.c. doses. The greater ease of administration of the concentrated serum is obvious. In addition, the frequency of immediate and febrile reactions is probably less. Probably the greatest value in using the concentrated serum consists in a decrease in

frequency and severity of the symptoms of serum disease. With present knowledge, however, there is no way in which these unpleasant but harmless symptoms may be completely avoided. After all, in a very serious disease like Type I pneumonia, from which, unless serum be administered, 1 patient in every 4 dies, a few days of itching of the skin and pain in the joints is not too high a price to pay for restoration to health.

The complaint is sometimes made that after all, serum treatment is possible in only a part of the cases of pneumonia, and attempts are made to treat all cases of pneumonia, either with Type I serum or with so-called polyvalent sera. One might as well argue that it is useless to treat patients suffering from diphtheria with serum, because this treatment is not also effective in cases of malignant streptococcus sore throat.

Much stress has been laid upon the possible dangers of violent reactions. There are some risks but we now know how to avoid them. That disastrous results did not occur when we first began using very large amounts of serum intravenously, when we did not know the dangers or how to guard against them, shows that the dangers are not too great. By making preliminary tests for serum sensitiveness, by proceeding very slowly in the first injections, and by prompt use of adrenalin in case any symptoms occur, the possibilities of serious complications are almost entirely avoided.

Opinions differ as to the effectiveness of Type II serum. Our own early experience was not very favorable and we decided to give our entire attention to the treatment of Type I cases. The more recent statistics are a little more promising. It is possible that this serum may still be improved, and where the very best serum is available it is even now justifiable to employ it in the Type II cases. On the other hand Type III pneumococci differ so fundamentally in their immunological properties from pneumococci of Types I and II that at present it does not seem advisable to attempt to treat patients suffering from Type III infection, with serum.

The pneumococci previously designated as belonging to group IV have now been divided into a large number of types, which have been numbered consecutively from V to as many as XXXII, and there may still be others. Certain pneumococci of these types, notably V, VII, and VIII, have been found to be responsible for a not inconsiderable number of cases of lobar pneumonia, though of course relatively a small percentage of the total cases. Sera have been produced by several commercial firms and public health laboratories against pneumococci of certain of these types. Especially in Type VII and Type VIII pneumonia a considerable degree of success in treatment has been obtained, though the experience is still too limited for final conclusions to be drawn. At present the main dependence must be placed on treatment with Type I serum, and since the number of Type I cases is so large and the serum so effective, the saving in human lives by the proper use of this form of treatment is bound to be considerable.

In the light of the evidence which I have briefly presented it seems that public health authorities are not only justified in attempting to limit the spread and decrease the mortality resulting from acute pulmonary infections, but that it is their duty to do so.

To be effective this work will require extensive organization and continuous effort and it will demand the coöperation of physicians with the health organizations. The campaigns now being

conducted in Massachusetts and New York State are providing experience as to the best methods of procedure. The campaign cannot be merely one of education. Active steps will have to be taken by public health authorities and these must consist, (1) in providing laboratory aid so that all cases may be accurately and promptly diagnosed; (2) in arranging for the proper registration of all cases and in carrying out epidemiologic studies; (3) by educational measures providing for proper isolation of patients; (4) supplying serum that is of maximum strength; and (5) assisting in the prompt and proper administration of the serum.

Too much must not be expected immediately in the way of decreased incidence and lowered mortality rates. Years of effort have been required to control typhoid fever and diphtheria. Such campaigns, like avalanches, gather momentum and increased power as they proceed. The institution of efforts by public health authorities will spread information concerning these conditions among the medical profession and the laity, will lead to increase of knowledge concerning the epidemiology of the disease, and will stimulate investigation into the details of the infective process and of the nature of immunity. It is indeed on the results of these investigations that we must ultimately depend for methods which will permit the complete control of this group of infections. Let us hope that the public will give the needed support; and may the time be not too distant when the deaths from "pneumonia" as recorded in our statistics will be as infrequent as are now the deaths from "fever," when as few persons will die from Type I pneumonia as now die from typhoid, and when we can look back at the triumph over acute pulmonary disease with the same satisfaction with which we now regard the victories over acute infections of the intestinal tract.

Using the Truth We Have

NOTHING in science is more laborious than the clarification of the factors which influence health. Human environment is so complex, man himself is so complex, and his powers of modifying himself to suit altered situations so great that it is only by prolonged observation and experiment, constantly evaluated, that we ever approach the truth. This, however, is no excuse for not using the truth when we have got it. Here indeed we may justly complain; but let us be sure that the fault does not lie with those who are able to use the truth.—Dunstan Brewer, D.P.H., *Ann. Rep., Medical Officer of Health for the Year 1935,* Borough of Swindon, p. 8.

Recent Advances in Administrative Technics*

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WE convene annually as Fellows and Members of the American Public Health Association because we have chosen as our life work the profession of sanitary science, dedicated to the improvement of the health, welfare, and happiness of mankind. Of no group can it be more truly stated that it is the combined product of heredity and environment and, like most humans, we find ourselves blessed with kindly and helpful characteristics but at the same time burdened by obsolete and ill-founded theories and practices. Fortunately, in our case, the inherited concepts may be cast aside without awaiting a new generation.

Early health programs considered the whole community because they were environmental. Witness the elimination of the exotic plagues of typhus and cholera, and the rapid control of typhoid and other filth-borne and water-spread diseases. The intermediate era concentrated efforts on the common communicable diseases, and made programs in terms of the lowest group in the community. This period was short-lived and disappointing because of the failures in quarantine and isolation, and the unwillingness of disease as well as physical and mental imperfections to recognize any class, social or geographic distinctions. Present-day plans must consider all classes because education and not service is the basis for work.

There is an ever-changing philosophy of the administration of public health. Health departments were born in the nauseating, offensive airs and vapors of the open sewer which gave forth its lethal gas; in the miasmal emanations from the deadly swamps and marshes; in the esthetically disagreeable associations of the garbage dump. But today, well beyond the life giving age of 40, we find many a public health department still smugly complacent and making little or no effort to extract the public health budget from the garbage fund. We who become self-satisfied and unwilling to travel with the tide of scientific progress, are doomed to destruction. Public opinion and smartness will rapidly expose our weaknesses, and demand for the advantages of modern health service will force our retirement. We have bemoaned the want of opportunity and the lack of funds, but the increasing availability of federal funds through the U. S. Public Health Service and the Children's Bureau now presents a potent challenge.

The outstanding need is for the establishment in every local area, whether city, county, or district, of a full-time public health service under the direction of a health officer sympathetic

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to the viewpoint of community-wide participation, one who can understand the advantages of weaving into his program the more or less latent potentialities to be found in the lay, the professional, and the teaching groups. Not only should the health officer be a man of experience and training, but his responsible subordinates should have a corresponding training in their special fields of activity. There should be, in addition to the public health administrator, the necessary professional, technical, public health nursing, engineering, laboratory, and educational assistance. The lack of funds, as well as the want of lay appreciation of the results to be obtained, has prevented more rapid progress, but now, with the assistance of the federal government and the states, local health organizations are being developed more rapidly. At the end of 1935 the U. S. Public Health Service reported that 612 counties in 32 states had whole-time county or district health services, an increase of 71 units over 1934. During 1936 progress has been more marked, and states like North Dakota, Wisconsin, and Indiana, have established their first county health units with the aid of state and federal funds. Available records in the Surgeon General's office as of July 1, 1936, indicate a total of 820 counties under full-time health service, distributed among 39 states.

The health commissioner as the administrator and leader is the key man in the community health organization. The responsibility demands real leadership. Not only must the health officer possess a basic training in public health science and a willingness and ability to work effectively with lay and professional groups, but he must also possess at least two essential characteristics:

The health director must have the ability to study and see clearly his own program in relation to local problems and needs, to the end that his program will develop the most effective use of personnel and funds at his command. While it is true that there are certain fundamental essentials to all well balanced public health programs, there has been too great a tendency to standardize, to routinize local health programs, especially in methods of approach in health education and in the provision of preventive medical services for individuals at various economic levels. Too many health officers adopt a certain type of program simply because someone else has that type of program. Some of the outstanding health departments of this country—Milwaukee, Baltimore, New Haven, and Syracuse—have been successful because they have not followed the other fellow's plan but rather have developed their own in the light of their own problems and possibilities. Let us not forget that local problems and local possibilities are not necessarily synonymous.

Educational groundwork must precede corrective action, especially when the pocketbook is affected. Surely, no individual desires to die prematurely, and no sane person wishes to be responsible for the death of another. Nevertheless, the health officer who boldly invades a community which has not benefitted by an educational program establishing in the lay mind the relation between impure milk and the death of babies, will literally be driven from his home and family if his first official act is to require universal pasteurization of milk. The need of this safeguard is apparent to every sanitarian, but the health official must not travel too far ahead of public opinion, especially when local pride is affected. Contrariwise, the health officer who questioned the desirability of 100 per cent pasteurization in Boston or Cincinnati would be guilty of official suicide.

Capable leadership on the part of the health officer involves the development of services which, with the exception of research work, will show measurable, demonstrable results within a reasonable period of time.

The health director must have the ability to develop a morale—an *esprit de corps,* in his own organization. He should be able to imbue his personnel with the feeling that each individual's work is important and worth doing and that each who does his or her work well will find self-satisfaction in the knowledge that his work has added materially to the health and happiness of the people of his community. There is nothing sadder than the public health nurse or sanitary inspector who sees nothing but a day's work in his job. The health officer who is a leader should supervise, guide, and stimulate, but at the same time permit the free play of each individual's own creative ability. Thus is real progress achieved. Frequent staff conferences are especially helpful in the development of teamwork. An outstanding medical school is directed by the teamwork of a qualified faculty rather than an autocratic dean. Group thinking among executives which comes from discussion prevents individuals from carrying on little shows of their own which are inimical to each other and preserves a solid front to the public. The entire health department personnel should be kept informed regarding the major objectives to be obtained. Incidentally, the administrator may then rest assured that the general policies, understood by all his staff members, will be continued while he is absent on vacation.

The health education program should be built around the soundness of the department's policy and not around the fanfare and ballyhoo of the health officer. The late Enion Williams, for many years the distinguished health commissioner of the State of Virginia, was asked to what he attributed his long tenure of office. The reply was to the effect that he had always submerged his own personality and name in an endeavor to establish a widespread public confidence in the work of the State Health Department.

While, with the expansion of human interest in disease prevention, there has developed an increasing willingness of individuals and communities to support health organizations, there still remains the need of conserving to the utmost the relatively limited funds which can be expended in this field. Frequent, well thought out tests of the effectiveness of procedures are becoming more common each year. While the cause of public health is being aided measurably by the availability of Public Health Service and Children's Bureau funds, we should bear in mind that these funds will quickly "dry up" unless we not only make effective use of them but also show an increasing willingness to assume locally our fair share of financial responsibility for providing essential health services. On the other hand, we cannot expect adequate local financial support until specific local health education has been successful in persuading a substantial portion of our people that public health protection is worth purchasing.

We have long complained of the lack of trained personnel and have too frequently been satisfied with employment of mediocre and unprepared assistants, many of whom have been thrust upon us by political pressure. Our fellow health workers employed by the non-official agencies not infrequently look down upon the official health department personnel with a certain degree of scorn and, unfortunately, in too many instances there has been justice in the assumption of such an attitude. Low requirements and standards establish a

low level of service in public agencies. Now, do not misconstrue my meaning —I am not directing these remarks at all health departments. Nevertheless, every one of us has knowledge of the existence of conditions such as I mention.

In the employment of public health nurses some health officers seem to take the attitude that the completion of a hospital training course involving its hours of drudgery and maid service qualifies any nurse to enter the field of health education. We need something more than the reception of a new recruit, welcomed by a broad administrative smile, and waved with the friendly thrust of a shoulder into the adventurous field of family education. The National Organization for Public Health Nursing has striven diligently to impress us with the need of employing trained personnel. The very least that we, as health officers, can do is to strive toward their excellent standards as a goal. In most communities the early adventures in promotion of health education through the employment of public health nurses were started by the ever alert private agencies who saw the possibilities of reducing the tuberculosis death rate; of cutting down the high mortality of infancy; of establishing safeguards for the expectant mother; and, in general, carrying the message of good health to the public. Quite properly, as time proceeded and as there was engendered in the public mind a consciousness of the value of these services, cities and counties assumed their rightful responsibility and began to employ nurse-educators. In so doing we have not always adhered to the standards set by our predecessors.

Now we are faced with that golden opportunity, offered by the Public Health Service through regional schools of public health to strengthen the training of our present personnel, employ the qualified health educator, statistician, laboratorian, and public health engineer. Incidentally, it is more economical to employ young sanitary engineers rather than untrained politicians as health inspectors. The turnover among them is greater but they bring a freshness to the service which prevents it from becoming perfunctory. The same is true with other trained personnel.

It is ill advised for the health officer to isolate himself from community interests, especially the medical profession. Unwarranted suspicions have developed on each side. Recognizing the desirability of family-physician participation in a community health and welfare program, it is essential that every private physician should be thoroughly conversant with the newer technics and procedures which aim to prolong human life. He must familiarize himself with the technics for diphtheria protection, with current knowledge regarding whooping cough and scarlet fever; he must be well acquainted with the tuberculin test and the roentgen findings which reveal suspicious tuberculosis; he must know the syphilis problem; he must be alert to the significance of the abnormalities which lead to cancer, cardiac disease, and the degenerative diseases of middle and late life. Briefly, he must be conscious of the part he can play in discovering such imperfections in human life, and provide the means of their prevention or alleviation.

In spite of the remarkable reduction in death rate, tuberculosis causes 3 times the deaths of all common communicable diseases in children, and retains first place on the mortality tables in young adult life. We recognize the value of such community facilities as clinics, both diagnostic and treatment, hospitalization of infectious cases, provision for open window and

open air schools, camps and preventoria, control of sanitation and milk pasteurization; but we can truly hide our faces in shame when we examine our case finding facilities. The *Appraisal Form* of our Committee on Administrative Practice offers a perfect score if 20 per cent of notifiable cases are minimal. I venture the opinion that not half a dozen major cities have even reached this goal. Are we to remain complacent when 4 out of 5 of all tuberculosis cases first coming to our attention are moderately or far advanced? We could never expect to arrest the progress of a typhoid epidemic if we knew only of the dying cases.

Our tuberculosis case finding and epidemiological services are still of a primitive character. We are losing an opportunity to render efficient service to the public through prompt isolation; we fail to serve the patient with modern treatment and we fail to enhance his opportunity for complete recovery and return to usefulness as a wage producing citizen; we continue the extravagant expenditure of public funds to hospitalize the advanced case. The period of hospitalization and the cost to the individual or taxpayer can be halved by finding the minimal case rather than delaying until the patient has developed tuberculosis in a more advanced stage.

Why not boldly endeavor to increase the proportion of early cases to at least two-thirds of those reported to the health department? Save the dollars in our hospital budget by expending one-tenth the sum in the preventive technics of early case finding. How better can this be accomplished than through the coöperation and participation of the family physician? It is he who most frequently observes the early signs of disease and, he must become conscious of the central part which he must play in the tuberculosis as well as all other phases of the preventive medicine program. First, he must realize that early diagnosis requires a tuberculin test and roentgen examination of the chest. Night sweats, cough, fever, loss of weight or appetite, and hemorrhage are not diagnostic of minimal cases. Then, he must share with the health department the responsibility of searching for and examining contacts to known cases of tuberculosis; in routinely testing school children of a selected age or grade; in systematically canvassing certain geographic and racial groups among whom tuberculosis presents an unusual problem. The office of the practising physician must become a House of Health, closely linked directly as well as indirectly through the local medical society with the health department. Such office is a health center to which the layman may go with confidence that he and his family will receive the full advantages of modern medicine. The alert physician will not overlook this unique opportunity to spread the gospel of personal hygiene and utilize the recognized technics of health education.

Postgraduate medicine is no innovation, but the establishment of refresher courses in preventive medicine is rather a new development. Such undertakings have been sponsored in recent years by the W. K. Kellogg Foundation, the Commonwealth Fund, certain state health departments—notably those of Massachusetts, Mississippi, and Virginia — Vanderbilt University, the Michigan State Medical Society, the Detroit Department of Health, and other organizations. Their influence in promoting child health through the family physician is now well recognized. Unfortunately, however, there are many physicians, especially in the large cities, who are not wont to attend post-

graduate courses. They do not belong to hospital staffs nor are they members of the local medical society. The layman, in his ignorance, may not discern between the qualified coöperating doctor and the one who practises in the shadow-lands of pseudomedicine.

It behooves the health officer to see that each licensed physician is thoroughly conversant with the plans of the public health program and has learned the technics and the interpretations of the medical services. A medical coördinator to cultivate the relations with professional groups, to visit physicians and dentists in their own offices, to demonstrate there, as well as before society meetings, the significant tests, to carry the educational program into undergraduate medicine, is becoming an urgent need for every modern health department. In small organizations the health officer may serve in this capacity; in a large city there should be a full-time deputy commissioner appointed as director of medical relations. Such an individual has just been chosen for the Detroit Department of Health. We expect through his aid to stimulate an ever increasing interest in the practice of preventive medicine by the family physician.

In order that the advantages and the availability of these services may be known to the laity, it is essential that public health departments and allied organizations conceive and conduct well designed and executed programs in health education. The tools of popular health instruction, involving the spoken or printed word, the radio, printed literature, talks before various lay groups, and other technics too numerous to mention, have been effectively employed in innumerable instances. In addition to this, there is need for more intensive use of trained personnel in the field of individual health education. For this purpose the well trained public health nurse can be of great service. Evidence of the effectiveness of this type of coöperation is found in every modern health organization.

In those communities where sympathetic health officer and medical profession coöperation is forthcoming there is evidence that services are being dispensed in an ever increasing quantity by the family physician. For example, in the city of Detroit, all the diphtheria prevention treatments are being given by the family physician and three-fourths of these are being paid for by the parent. Each year the percentage of preschool children protected has increased until now 60 per cent are known to have received such service. In 7 * typical rural counties in southwestern Michigan the county health departments, in coöperation with the W. K. Kellogg Foundation, have established the most highly developed participation program with the physicians, dentists, school teachers, and other local educational facilities. Here it may truly be said that professional men are conscious of the opportunities of preventive medicine and the public is being taught where to secure the advantages of such service. There seems to be an increasing appreciation on the part of parents that preventive medicine is a purchasable commodity and that when the family purse will permit, it should be purchased the same as any other essential of life, such as food, fuel, or shelter.

I fully realize that I have added nothing particularly new in the field of administration technics, but I have endeavored to re-assemble some of the opportunities which we possess to strengthen and enrich our community health services with a view to increasing the health, welfare, and happiness of mankind.

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* Allegan, Barry, Branch, Calhoun, Eaton, Hillsdale, Van Buren.

Bacterial Limitations in Ground Fresh Meat

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DURING the fall of 1933 we sought to determine the bacterial value in testing the wholesomeness of ground fresh meat, especially hamburger.

This was occasioned by the fact that numbers of people were complaining that this type of food, which they had purchased, was off flavor, if not actually spoiled. Our city ordinance provided penalties for the selling of "unwholesome" food. We were, however, handicapped by difficulties found in defining the meaning of "unwholesome." One case involved the need of expert testimony which we could obtain only at considerable expense. The experts themselves were put to considerable trouble as two of them had to travel between 50 and 75 miles, losing time which could hardly be compensated for by money. It was certain that such a method could not be made practical.

The ground meat, or hamburger as it was called, involved in this case, showed a bacterial count of 85,000,000 per gm. It was unquestionably bad. The court so found and levied a fine of $50.

It could be plainly seen from this that if we were to cope successfully with this problem some simple method must be devised. The question confronting us was this: Was there a certain bacterial development which could be depended upon as indicating a generally recognized state of unwholesomeness? Our tests appeared to show that there was.

COLLECTING SPECIMENS

The method employed in collecting the evidence was very ordinary. Specimens were obtained by inspectors by purchase, it having been decided that this presented the true side of the problem as it affected the consumer. When questionable delay was involved, specimens were packed in ice until delivery to the laboratory. This, however, only involved those taken at considerable distances or in a way that might raise an issue.

There was a tendency on the part of some merchants to prepare the sample. This was objected to, the inspector insisting upon the delivery of that displayed for sale.

It was thought advisable to inform merchants of the purpose of the purchase. This enabled them to take specimens for themselves, which many did, for the purpose of "comparing tests." Whether they had such tests made or not we were unable to learn, except in a very few instances. It appeared, however, that all were satisfied with our findings, as no protests appeared. Each merchant was notified as to findings as soon as the specimens from his place had been examined.

LABORATORY TECHNIC

The procedure for evaluating the number of bacteria was as follows:

1. The ground meat specimen received at the laboratory was in the same wrappings as used in delivery to the public.
2. The entire sample was weighed. Ten grains were transferred to a 90 c.c. sterile water blank with a sterile spatula. Care was used to get as complete a cross-section of the sample as possible.
3. The blank was then shaken vigorously for 30 seconds. Two dilutions were made from the original 1 to 10 dilutions, 1 to 1,000. and 1 to 100,000. From the latter, plates were poured, with additional plates with 0.1 c.c. of the 100,000 dilution, giving check plates of 1 to 100,000 dilution.
4. The plates were incubated for 48 hours at 37° C.

The media used were plain nutrient agar. An index of the laboratory results is shown in Table I.

TABLE I

RESULTS OF BACTERIOLOGICAL EXAMINATION OF SPECIMENS OF HAMBURGER, OR GROUND MEAT COLLECTED FROM MEAT MARKETS

Sample No.	*Bacteria per Gm.*	*Sample No.*	*Bacteria per Gm.*
1	300,000	21	100,000
2	200,000	22	3,800,000
3	9,800,000	23	10,000,000
4	5,400,000	24	100,000
5	600,000	25	3,500,000
6	600,000	26	700,000
7	1,000,000	27	1,200,000
8	600,000	28	3,600,000
9	700,000	29	5,000,000
10	1,200,000	30	2,100,000
11	1,500,000	31	300,000
12	9,500,000	32	20,000,000
13	3,200,000	33	3,800,000
14	1,700,000	34	5,000,000
15	4,500,000	35	500,000
16	7,200,000	36	100,000
17	400,000	37	400,000
18	6,200,000	38	4,500,000
19	2,100,000	39	800,000
20	900,000	40	700,000
		41	4,800,000

As soon as possible after the bacterial count was certified the meat market was notified. Where the count was above 10,000,000 per gm. a communication accompanied the count explaining our position relative to the high count. The result was without exception a very noticeable improvement. Bacterial counts were less in number and the ground meat was much improved in quality.

A few of these results are shown in Table II. This is, however, only part

TABLE II

SHOWING DECREASE IN BACTERIAL COUNT FOLLOWING NOTIFICATION OF EXCESSIVE COUNT

Establishment No.	*Bacteria per Gm. Original Specimen*	*Bacteria per Gm. Following Notice*
4	32,000,000	1,600,000
5	21,000,000	6,000,000
7	13,000,000	2,800,000
9	19,000,000	500,000
10	10,000,000	2,800,000
12	18,000,000	8,000,000
14	17,000,000	4,000,000
15	15,000,000	900,000
16	16,000,000	1,100,000
19	19,000,000	600,000
20	19,000,000	300,000
21	26,000,000	1,800,000

of the picture. Subsequent counts showed a continued improvement. For instance, in the case of establishment No. 5, the count decreased on successive specimens, taken several days apart as follows: 1st, 21,000,000; 2nd, 6,000,000; 3rd, 1,700; and 4th, 700. This was similarly repeated in No. 12: 1st, 18,000,000; 2nd, 8,000,-000; and 3rd, 100,000; and again in No. 21: 1st, 26,000,000; 2nd, 1,800,-000; and 3rd, 300,000.

AN ORDINANCE NOW IN FORCE

Such showings as these made it possible for us to go before the City Council and ask for an ordinance fixing a bacteria count for determining the wholesomeness of hamburger, or ground fresh meat.

This ordinance reads as follows:

Unlawful Bacterial Content of Ground Meat—It shall be unlawful for any meat market to hold, sell, or offer for sale any hamburger or fresh unseasoned ground meat the average bacterial count of which exceeds 10,000,000 per gram. The average bacterial count shall be deemed to mean the logarithmic average of the bacterial counts of all samples taken during a period of not less than 4 days, and including at least four samples taken on separate days.

It is gratifying to say that we have not found it necessary to prosecute a single case for violation of this standard for the reason that we have never been able to get 4 successive high counts in the 2 years and 6 months the ordinance has been in effect. Notices of high counts are always followed by improvements in line with that shown.

Mosquitoes In Aircraft

A GOOD deal has been said and written upon the carriage of insects, and particularly mosquitoes, in aircraft.

In connection with yellow fever, the general opinion appears to be that there is very little risk of the carriage of infected mosquitoes by this method. At the International Health Conference, held at Cape Town in November, 1932, ". . . it was agreed that the risk of transporting mosquitoes in an infective condition is comparatively small, and can be met by the simple measure of de-insectisation of aeroplanes. Aedes may travel by trains or motors with equal facility. . . ."[1]

The majority of authorities on the subject have referred to this simple measure of de-insectisation. The method is simple, but its application in the ridding of an aeroplane of all insects definitely is not.

That "Aedes may travel by train or motors with equal facility" may be true; but would they travel as far in, say, four hours as they would do by aeroplane? In Africa, neither trains nor motors normally travel 300 or 400 miles without a stop, nor do they usually travel with doors and windows closed. In trains and motors mosquitoes have almost uninterrupted opportunities for escaping. It is not so in aeroplanes, from which escape is only possible at stopping places hundreds of miles from the starting-point.—*Quart. Bull. Health Organisation of the League of Nations*, V, 1:81 (Mar.), 1936.

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1. *Quart. Bull. Health Organisation*, 1933, 2, p. 19.

Diagnostic and Immunological Tests of Rabies in Mice*

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THIS report deals with a method for diagnosing rabies by inoculating suspected material into mice and with tests for evaluating antirabic vaccines in mice.

Recently interest in rabies has become widespread. Public health authorities note an apparent increase in prevalence of the disease in animal species and recognize its consequent threat to man. Methods to control its spread in dogs have not, in most localities, met with conspicuous success. The effectiveness of canine preventive vaccination as now practised is questioned, and doubt is cast as to which of many methods of treating humans following exposure is preferable. Moreover, laboratory workers with new knowledge of viruses seek further data on rabies as the outstanding example of a virus disease in which immunization can supposedly be secured by a non-living vaccine, and in which the virus agent spreads in the body presumably along the nerves. A renewed study of rabies is timely, therefore, both from theoretical and practical viewpoints.

A review of experimental work on rabies brings out at once a fundamental and well recognized difficulty, namely, the lack of a test animal and a technic insuring quantitative results. If animals are inoculated with rabies virus in a manner approximating nature, their individual responses in general are irregular and difficult to measure, while if they are inoculated with large doses directly into the brain in order to eliminate these variations, all are usually overwhelmed. For example, when batches of animals are injected with material for diagnosis, irregularities of incubation period are encountered. When vaccinated and non-vaccinated animals are compared for resistance, any differences which may be present are masked if the test injection is made directly into the brain, and are difficult to measure if the injection is made peripherally. Due to inadequate methods of investigation, many problems in rabies remain unsolved.

The technical difficulties have now been overcome in part by finding that special strains of mice bred for susceptibility to virus infections are 10 to 100 times more susceptible to rabies than other laboratory animals per gram of body weight. One one-hundred-millionth gm. of mouse brain virus is fatal to at least 50 per cent of these mice when injected intracerebrally; larger quantities are practically always fatal. Injected into the tongue, cheek, thigh, or subcutaneous tissue, 1/10,000 gm. or more is similarly fatal. The peri-

* Read before the Epidemiology Section of the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 20, 1936.

toneal route, however, is somewhat less effective. These mice, therefore, become the animals of choice in the experiments now to be described.

A diagnostic test by mouse inoculation was developed [1] as a possible aid to the Negri body method. Sterile bits of Ammon's horn of the suspected case of rabies are emulsified in distilled water to make a 5 to 10 per cent suspension; 0.03 c.c. of this is then injected intracerebrally, and 0.25 c.c. intramuscularly into each of 6 Swiss mice. One animal is sacrificed on the 5th, 6th, and 7th days respectively and their brains examined for Negri bodies. The remaining 3 are observed for 4 weeks for signs of rabies. When prostrate, they are sacrificed and searched for Negri bodies.

Forty dog brains received by a city department of health have been tested. In 32, no Negri bodies were found and the inoculated mice remained well. In the remaining 8, a positive diagnosis was confirmed within 10 days by animal inoculation.[1] Brains of 28 supposedly normal wild animals have likewise been tested. Three of 9 skunks were positive by the mouse inoculation test. This brief experience suggests that this diagnostic tool may aid in the more accurate determination of the foci of rabies, together with its amount and spread in a given community.

The immunizing value of commercial antirabic vaccines has been studied by using a mouse serum-protection test and a mouse resistance test. The serum protection test was employed to measure the amount of neutralizing antibodies produced in humans following routine vaccination. It was also used to measure neutralizing antibodies in mice following experimental vaccination. Undiluted serum is mixed with equal amounts of mouse passage virus in various dilutions, the mixtures are heated at 37° C., and each is injected intracerebrally into 4 mice. The titer of virus plus normal serum is read as that dilution giving 50 per cent or more mortality in the injected mice. This titer, 10^{-5} or 10^{-6}, is compared with that of virus plus unknown sera.

In one series of tests, sera of persons treated with vaccines containing live virus were found to neutralize 100 to 1,000 lethal doses of virus over periods as long as 4 years. In another series, 23 nurses, physicians, and laboratory workers, receiving the full course of 14 doses of Semple vaccine, "G", have thus far been tested over a 15 month period (Figure I). Their sera, by the last day of treatment, showed antibodies neutralizing for the most part 1 to 10 lethal doses of virus. At 2 months, all those tested neutralized 10 to 100 or more doses, and from that time through 15 months all neutralized a full 100 lethal doses of virus. Finally, a group of 17 persons, receiving Semple vaccine, "N", from another laboratory, failed to neutralize the virus to any significant degree over an 8 month period (Figure I). Apparently, therefore, not all preparations of Semple vaccine are equally potent in stimulating neutralizing antibodies in humans.

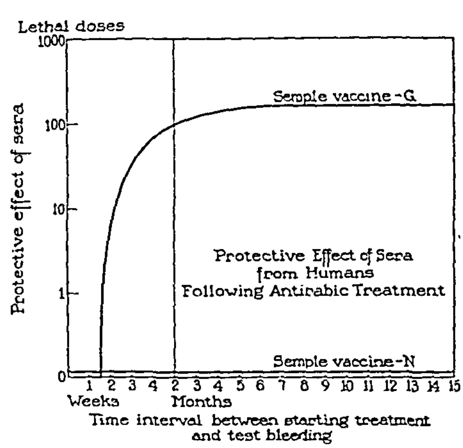

FIGURE I—Protective effect of sera from humans following antirabic treatment

Attention was next turned from humans to mice to determine whether commercial vaccines could produce not only neutralizing antibodies but actual resistance. Since some of these vaccines contained live virus, tests were also made of the effectiveness of virulent mouse passage laboratory virus. Live virus given subcutaneously in a single dose supposed to contain 1/10 the average minimum infecting dose produced rabies in an occasional mouse and in the remainder stimulated but little neutralizing antibody production and little resistance to a subsequent intracerebral test infection. A smaller vaccinating dose still brought down an occasional mouse with rabies and failed to immunize. Live virus given intraperitoneally, on the other hand, proved less infectious, and a single dose containing 1/10 to 1/100 of the average minimum infecting dose, although it produced rabies in the frequency of about 1 animal in 100, stimulated neutralizing bodies within 10 days in the remaining 99 per cent and rendered them actually resistant to 1,000 intracerebral lethal doses. This resistance has lasted 6 months and is active against all strains employed. Vaccination of mice with mouse passage, live virus, therefore, is dangerous and unsatisfactory if given subcutaneously; if given intraperitoneally in a single dose, it remains slightly dangerous but very effective.

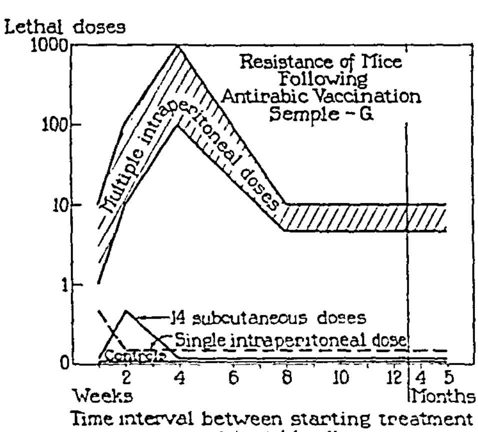

FIGURE II—Resistance of mice following antirabic vaccination, Semple " G "

Commercial vaccines said to contain live virus, when injected intracerebrally, brought mice down promptly with rabies, but when injected peripherally were relatively harmless. Given to mice as a vaccine according to directions, by the subcutaneous route, they did not immunize; by the intraperitoneal route, however, they produced both neutralizing antibodies and resistance in high titer. In this respect they resembled the single dose of virulent laboratory virus.

The standard Semple vaccines have been studied with special care. In the first place, Semple vaccine from laboratory " G " which in humans produced high titer neutralizing antibodies, when tested for the presence of live virus, invariably gave negative results. Repeated injections of many specimens directly into the brain, filtering or sedimentation of large particles of tissue in the vaccine, emulsifying them and injecting them intracerebrally and intraperitoneally in large doses have failed to produce rabies. If live virus was present at all in the " G " vaccines, it was there in minute, subinfective amounts. Secondly, Semple vaccine " G ", when properly employed, rendered the mice highly resistant to an inoculation of rabies virus directly into the brain (Figure II). But to achieve this resistance, vaccination was required not by the standard subcutaneous route but by way of the peritoneal cavity. Batches of 50 to 75 mice were vaccinated by different routes and with different numbers of doses, and tests made subsequently of their resistance to intracerebral injection of virus and their serum-neutralizing properties. The intraperitoneally vaccinated mice de-

veloped resistance within 7 days to 10 to 100 intracerebral doses of virus and also showed strong serum-neutralizing antibodies. Both antibody and resistance titers have continued at high levels during the 5 month period tested. Six intraperitoneal doses, 1 every other day, proved nearly as effective as 14 doses, 1 per day; 3, with 1 every other day, seemed ample for prophylaxis. A single intraperitoneal injection of vaccine did not render the mice resistant to the intracerebral test dose. The required amount of vaccine per dose proved considerably in excess of that employed for man per gm. of body weight. Finally, the effectiveness of "G" vaccine was found to deteriorate rapidly within 4 months after preparation.

Neutralizing antibodies were not invariably a direct index of the presence of resistance (Figure III). While vaccination of mice by the subcutaneous route failed to produce either antibodies or resistance, and *multiple dose* vaccination by the peritoneal route produced both, a *single dose* peritoneal vaccination produced antibodies but no resistance as tested. This question is being studied further.

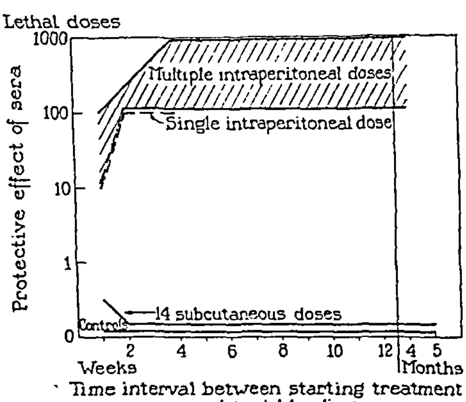

FIGURE III—Neutralizing antibodies in mice following antirabic vaccination, Semple "G"

From these experiments a test for evaluating the efficacy of antirabic vaccines in mice is being developed. The material is injected first directly into the brain and muscles of mice to detect live virus. Second, mice are vaccinated intraperitoneally with 6 doses, 1 every other day, each dose comprising ⅛ the stated volume diluted 10 times. These vaccinated mice are tested subsequently for their intracerebral resistance on the 10th and 21st days. The test, as now run, will doubtless be improved, but already it has classified the preparations into (A) those containing demonstrable live virus and protecting mice; (B) those containing no demonstrable live virus and protecting mice; and (C) those containing no demonstrable live virus and not protecting mice.

In conclusion, the diagnostic test, neutralizing antibody test, and resistance test provide methods for the quantitative study of rabies. Results thus far suggest, from the theoretical viewpoint, that neutralizing antibodies are not always a direct measure of resistance, and that vaccines containing no demonstrable living virus may produce resistance. Moreover, they show that the optimum method of securing prompt and effective immunity to rabies in the mouse is by the intraperitoneal injection of relatively large amounts of vaccine, 6 doses, 1 every other day. The work suggests from a practical viewpoint that rabies vaccines should be employed which have a high rating according to the mouse test.

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Bacteriological Examination of Glassware or China for Sanitary Quality*

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THE time has come when something must be done about the insanitary conditions prevailing in connection with the dispensing of beverages. Both the public and the public health officer agree on this. Although the problem has been met in some places by the use of single service paper cups, it is common knowledge that glasses are only superficially washed or disinfected between patrons. Our personal observations are that in many places dispensing beer, the glasses are not washed at all. This is probably true to a lesser extent in other beverage dispensing establishments. Sporadic efforts have been made to remedy this situation in some cities. At best, such efforts have been considered only partially successful even by their sponsors. As Calver [1] has pointed out, there is a real opportunity to better control of respiratory diseases by means of improved sanitation of glasses and other eating utensils.

However, before we can expect the health officer or his inspectors to improve conditions very much, he must be provided with certain information. First, he must have a reasonably reliable method whereby he can determine whether glasses and dishes have been improperly handled; second, he must be able to offer definite constructive suggestions as to effective washing equipment and methods. We believe that the lack of positive information on these points has delayed the carrying out of a much needed program of education and compulsion in regard to the unclean utensil situation.

METHODS IN USE

A good list of technics for the bacteriological examination of glasses has been compiled by Calver.[2] These include various modifications of the swab method, rinsing, direct plating of utensils, direct microscopic examination after staining, and several others. The agar disc method, used by Olson and Hammer [3] to study churn contamination, was considered by us to merit some study as to its possible use in public health work. The agar medium is allowed to solidify. The agar disc is then picked up with a sterile spatula,

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Contribution No. 258, Massachusetts Agricultural Experiment Station.

placed in a sterile Petri dish and allowed to incubate. The colonies developing on a measured area are counted and the results expressed as number per sq. cm.

COMPARISON OF VARIOUS BACTERIOLOGICAL TECHNICS

In all, 18 different methods of sampling glasses and dishes were compared for utility, accuracy, speed, and simplicity.

A method to be of use to the busy health officer or his laboratory must be relatively simple. We realize that no method will give much information as to pathogens. Of the many organisms transmitted by the mouth secretions, only the diphtheria bacillus and the pathogenic cocci can be recovered with any degree of success. We must then turn to total counts to guide us in making a decision as to the sanitary quality of glassware and its likelihood of transmitting disease.

The agar disc method was too difficult to use, resulted in too many failures, and could be applied only to small areas of the glass. However, the recovery of bacteria artificially inoculated on glasses was approximately 50 per cent. The microörganisms used were *Serratia marcescens* and *Escherichia coli*.

The making of rim impressions of glasses and other containers on agar plates was tried many times. Both firm and soft agars were used. This method possesses the disadvantage of contacting only limited portions of the container. It is subject to contaminations, is not readily carried out in restaurants or drinking places, and results cannot be easily duplicated. Furthermore, colonies tend to be confluent, and counting is difficult.

Direct plating of pieces from broken glasses and cutouts from paper cups were investigated. This method is decidedly unsatisfactory from many points of view. Direct microscopic examination of broken glass rims, stained with various stains in an effort to make the bacteria visible, was almost a total failure. In the case of paper cups, the method failed to give good duplicate results and bacteria often failed to grow from the surfaces of the waxed paper, even though they had been artificially inoculated.

The many variations of the swab method will not be enumerated here. We tried swabs of different sizes with applicators of different lengths in test tubes containing broth, saline or distilled water. Different methods of swabbing, and a number of media were also tried out. In general, all swab methods were very practical, rapid, and simple. The recovery of bacteria was always over 40 per cent and often 75 per cent with *Serratia marcescens, Escherichia coli,* and *Streptococcus hemolyticus*. In mixed cultures used as inoculating suspensions, the percentage recovery was always less than when pure cultures were used. The many data obtained were used in the formulation of the standard method here proposed. They are too numerous for reproduction in this short paper. While the method in itself is not new and various parts have been previously described, we feel that a definite procedure if adopted by health laboratories for glassware examination will yield comparable results and will serve to give an excellent idea as to the sanitary condition of glassware.

PROPOSED STANDARD METHOD

SAMPLING

The method consists in preparing medium sized cotton swabs on wooden applicators immersed in approximately 3 c.c. of saline (0.8 per cent NaCl) in ordinary 25 c.c. culture tubes. The tubes are cotton stoppered with the

applicator sticks protruding slightly above the plugs. Sterilization is accomplished by autoclaving at 10 lb. steam pressure for 20 minutes. To avoid evaporation, storage should be at low temperatures.

Boxes or packets of these tubes are taken by the inspector who secures his samples as follows:

> Remove the plug; lift the applicator above the surface of the liquid; press against the side of the tube and twist so as to squeeze out as much excess saline from the swab as possible. Remove the applicator and thoroughly swab the inside and outside lips and rims of glasses. Replace the applicator in the culture tube and insert the cotton plug. A number of glasses should be swabbed in each establishment in order to obtain a fair average. Tubes should be labeled and returned to the laboratory for plating within a few hours, preferably 2 hours.

PLATING OF THE SAMPLES

Upon arrival at the laboratory the tubes are agitated by holding firmly in the hand and striking 25 times. Remove the plug, squeeze the cotton swab as before to remove excess liquid, and discard. The liquid contents of the tube are poured into a Petri dish. There is actually only a very small amount of liquid retained by the swab. At this point, the swab may be used to inoculate Loeffler's blood serum slants in an effort to isolate pathogens.

Next 7 c.c. of nutrient agar (2 per cent agar) is poured in the Petri dish and mixed thoroughly. Incubation is at 37° C. for 48 hours. Counts are recorded for individual glasses and not as averages.

With slight modifications the above

TABLE I

TEST OF PROPOSED METHOD USED IN SOME EATING PLACES

Establishment		*Bacteria per Glass Individual Counts*	*Average*	*Method of* *Cleaning*	*Rinsing*	*Drying*
Soda Fountain	1	3, 0, 2, 1, 9, 8, 1, 3	3	soap and hot water	hot water	metal racks
" "	2	3,900; 3,700; 670; 3; 20,700; 280	4,880	soap and tepid water	sozzle	shelf under counter
" "	3	2; 3; 580; 5; 120; 13,300; 9,300	4,720	dirty dish water	sozzle	metal racks
Restaurant	1	5,600; 360; 460; 3,300; 3,300; 2,100	2,520	dirty dish water	tepid water	dirty towel
"	2	150; 10; 45; 20; 23; 25	48	soap and hot water	hot water	clean towel and tray
"	3	134; 11; 400; 500	260	soap and hot water	hot water	dish towel
"	4	50: 15; 10; 8; 16	20	soap and hot water	hot water	dish towel
"	5	10; 12; 45; 9; 3; 4	14	steam washing machine	unnecessary	dish towel
Bar	1	2,800; 11,000; 50; 40; 160; 1,900; 20	2,280	warm water no soap	warm water	none
"	2	too numerous to count approximately 350,000	350,000	merely rinsed	cold water	none

method is easily adapted to the examination of dishes and silverware.

While occasional plates may be overgrown or colonies too numerous to count, the writers feel that plating the whole sample is better than making routine dilutions. At least, the results give an excellent idea as to the sanitary quality of the glassware examined. The method is also useful in the study of bacteriological effectiveness of mechanical dish washers and cleaning and sterilizing compounds.

Table I summarizes the results of a practical test of the proposed method used in some public eating and drinking establishments. A good correlation is shown between the care in cleansing and the number of viable organisms left on the glassware. These results should not necessarily be viewed with alarm, but they can be taken as good indications of the general sanitary conditions of the individual establishments. High counts should warrant more critical routine inspection by the health departments.

SUMMARY

A comparison of various methods for the bacteriological determination of sanitary quality of drinking glasses and eating utensils showed the swab method to be most satisfactory. From 40 to 80 per cent of the organisms present are recovered by this technic.

Specific directions are given for preparing sampling tubes, taking and handling samples, and recording results. These can be carried out at small expense in any health laboratory.

Practical tests of the method show it to be rapid, simple, and reliable. Health laboratories can use the method in a routine way to check cleansing and sterilization of utensils in food and beverage *dispensing establishments.*

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Novel Purification Design

. . . The principal novel features of Burnt Mills, Md., water purification works pertain to the treatment unit assembly, containing a pipe vault, 4 filters, each of 1¼ m.g.d. nominal rating, a filter control house, a coagulating basin having a 55 minute detention period, and a 275,000 gal. filtered water reservoir. These are built of steel, cylindrical in form, and arranged concentrically. The flat continuous bottom of the structure rests on a thin concrete base lightly reinforced and the outside frame of the reservoir is surrounded by a loose rock collar to a height of 4′, beyond which there is earth fill. All seams are welded with the exception of the roof of the filtered water reservoir which has a thickness of 3/16″, all plating is 5/16″ thick. No deterioration of the steel work in the plant has been found at the end of approximately 1 year's operation. At the present time a second filter plant of 5 m.g.d. capacity, is under construction.—*Annual Report of the Bureau of Sanitary Engineering of the Maryland State Board of Health—Year 1935.*

International Standardization of Biological Products by the League of Nations*

GEORGE W. McCOY, M.D

Medical Director, U. S. Public Health Service, and Director, The National Institute of Health, Washington, D. C.; Consultative Member of the Permanent Commission on Biological Standardization of the Health Organization of the League of Nations

WHEN we begin to think in terms of standardization from the international point of view, it is natural that we should consider what has been accomplished in fields other than those that are of special interest to us. Certainly not much standardization of language exists; there are at least two systems of weights and measures in common use; and we begin to think that perhaps time alone is universally standardized in the civilized world until we recall that the 24 hour day is in common use in much of Europe, and that we in some parts of the United States have been introducing a little elasticity by having daylight saving time during the summer months.

The question naturally arises as to how the United States came to participate in the League of Nations Conferences on Standardization while not a member of the League. The answer is that our State Department was equal to the task of deciding promptly when the matter was presented to it, and it was prescribed that the American representative should serve in a consultative, not in an advisory capacity. There really is a difference, if you think long enough about it. In practice it works out that he functions in the same manner as other members of the commission but does not vote.

The Standards Commission is a creature of the Health Organization of the League of Nations and accordingly its actions are subject to the approval or disapproval of that body.

There are two international organizations functioning in the field we are considering—the Permanent Standards Commission of the League, which has had about half a dozen meetings and has adopted the standards mentioned below, and the Inter-Governmental Conference on Biological Standardization to which were invited representatives of practically all of the countries of the world. This body has had but one meeting and, in general, adopted, without appreciable modification, the standards established by the Permanent Standards Commission.

The commission naturally takes into account any work that has been done

* Read before the Laboratory Section of the American Public Health Association at the Sixty-fifth Annual Meeting in New Orleans, La., October 21, 1936.

prior to its own consideration of any subject. Thus, for example, Professor Weinberg, of the Pasteur Institute, who has long been interested in the gas gangrene group of organisms and has done much work with these anaerobes was in a position to furnish a serum on which a standard for Vibrion septique antitoxin could be based. This serum was reduced to a condition to assure permanence, and a test dose was then determined. A previously ascertained unit of test toxin and an antitoxin of unknown potency were distributed for comparative testing in Copenhagen, Paris, Washington, and a number of other centers, 7 in all. The results at the 7 testing institutions were so close that it was decided to adopt the unit for international use.

In general, the commission defines standards and prescribes units, usually in terms of fractions of a milligram of the dry standard, but it does not undertake to lay down methods of testing, this being left to the individual choice of the various national laboratories. Standard preparations are distributed from the State Serum Center at Copenhagen for members of the serum-bacterial group, and from the National Institute of Medical Research, London, for hormones, vitamins, and other preparations in which the question of immunity does not arise.

It has been the policy of the commission to standardize preparations used prophylactically or therapeutically without reference to the degree of usefulness, the only policy that, in my judgment, could be readily justified.

The commission has refrained from taking action with respect to preparations where the standardization seems hopeless, for example, in the case of antimeningococcus serum. This preparation is often the subject of discussion by the commission and it always ends in the same way, namely, that we are still without sufficient information for effective standardization.

In addition to preparations of the group in which considerations of immunity arise and in which we are especially interested, the committee has undertaken through experts the standardization of certain drugs, for example, digitalis; certain hormones, for example, insulin; and nearly all of the group of vitamins.

Standards originating in America have fared very well with the international commission. It has adopted our units for antipneumococcus serum and for perfringens antitoxin. The latter is the most important member of the gas gangrene group.

The first unit to be adopted by the commission was that for diphtheria antitoxin. Here there was no difficulty in agreeing on the Ehrlich unit as it was used universally throughout the world although distributed from two centers, Frankfort am Main and Washington, D. C.

The international standard unit for tetanus antitoxin probably has provoked more discussion and has been the subject of more difference of opinion among members of the commission than any other five products, and that is putting it mildly. The competition for favor lay between the old German unit and the American unit, the former having the merit of priority, the latter of convenience in "size." Both were extensively used, probably about equally if we consider the whole world. The German unit was about 66 times the size of the American unit and it was generally recognized that this was inconveniently large. Therefore the German authorities adopted a new unit, approximately half the strength of the American unit. This new German unit was later adopted by the League Commission over the protest of the American representative. The attitude of

the American control authorities was, and has been, that they would be willing to consider any new unit that offered advantages over their own. As the situation stands, the two units are widely used and, indeed, some official control authorities require the label to show the number of units according to the two standards. The American control authorities require the use of the American standard and permit the use of the international unit. The matter is not without practical significance since 1,500 units of the international potency, the usual prophylactic dose of tetanus antitoxin, contains approximately the equivalent of 750 units according to the American standard. I say approximately because it has been shown that the new unit is not precisely one-half the American, but the difference is not of great importance.

Standards for scarlet fever preparations have not been adopted by the commission chiefly because of the control over these preparations by the organization holding the patents covering them. Personally, the writer doubts the wisdom of this policy of nonrecognition since the United States control authorities have found it practicable to standardize and control scarlet fever toxin and antitoxin in a manner which appears to be satisfactory to all concerned.

Antipneumococcus serum is the only antibacterial serum that is in contrast with antitoxic serum, that has been standardized.

I think all of you will appreciate the reluctance of control authorities to adopt units for antibacterial preparations. We are so accustomed to thinking in terms of toxin in serum neutralization tests that it goes against the grain to contemplate a standard unit based on a living culture.

Thanks to the work of Dr. Lloyd D. Felton, to whom the modern production and application of antipneumococcus serum is so largely due, and to the perseverance in attempts at standardization by certain commercial manufacturers of antipneumococcus serum, the difficulties were to a large degree overcome. After carrying on tests in various laboratories, the commission adopted the standards for types I and II. Dr. Felton's F-146 was taken as a basis for the standardization, and units were defined in the usual manner.

Aside from the tetanus unit, there has been but one immunological preparation on which the American delegate could not see eye to eye with his European colleagues. This was diphtheria toxin for the Schick test. The committee adopted a standard which took into account the neutralizing power of the toxin as well as the toxicity, whereas the American requirements cover only the test for toxicity which we have found quite satisfactory.

While the members of the arsphenamine group of preparations do not fall into the serum-bacterial group they should, on account of their interest to public health authorities, be mentioned here chiefly because the United States authorities employ methods of control different from those adopted by the League of Nations Commission. The first point of essential difference lies in the fact that the United States control authorities have not adopted a standard control preparation with which new commercial batches may be compared in toxicity tests. It was felt by the American authorities that assays were quite satisfactory when based simply on establishment of the toxicity of the preparation without the use of an official control standard, a method which has given satisfactory results over a period of many years.

The second essential point of difference lies in our unwillingness to adopt an animal test for therapeutic

Standard	*When Adopted*	*Int. Unit in Milligrams*
Diphtheria antitoxin	1922	0.0628
Tetanus "	1928	0.1547
Antidysentery serum (Shiga)	1928	0.0500
Gas-gangrene antitoxin:		
B. perfringens	1931	0.2660
Vibrion septique	1934	0.2377
B. oedematiens	1934	0.2681
B. histolyticus	1935	0.3575
Antipneumo serum, Type I	1934	0.0886
" " " II	1934	0.0894
Staphylococcus antitoxin	1934	0.5000
Diph. antitoxin for the flocculation test	1935	
Old tuberculin	1931	

activity. Our disinclination here springs from the conviction that the trypanocidal activity test does not furnish useful information in terms of curative action as applied to clinical conditions. A spirocheticidal activity test, which is the alternative permitted by the commission, seems impracticable of application on account of the length of time required to carry it out and the inherent uncertainties and difficulties of the test. Perhaps the satisfaction of control authorities in the United States with respect to our methods in this field arises from the fact that in the nearly 20 years of their use, there has not come to light any evidence of excess toxicity of any preparation that could have been detected by any other method of testing in use anywhere. Furthermore, there is no evidence of want of therapeutic efficacy of any product in the American market, whether produced here or abroad.

The above tabulation taken from the report of the Inter-Governmental Conference on Biological Standardization at Geneva, 1935, shows the progress that has been accomplished by the commission in the serum-bacterial group. All of these are distributed by the State Serum Institute at Copenhagen.

ACKNOWLEDGMENT

The Permanent Standards Commission has had the unselfish aid of two special experts, to whom acknowledgment is due, Dr. Percival Hartley, of the National Institute for Medical Research, London, and Professor Claus Jensen, of the State Serum Institute, Copenhagen.

We cannot close this brief account of the work of the Permanent Standards Commission without saying that whatever measure of success has attended the work of the commission, and I think it has been large, has been due almost entirely to the ability and to the influence of the gentleman who has been chairman throughout the period of the existence of the commission, Professor Th. Madsen, a man who, had his talents not been devoted to science, would have taken high rank as a diplomat—indeed, his diplomatic talents have been called into use in connection with the work of the Standards Commission about as much as his scientific attainments.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

SAVE THE SURGEON GENERAL'S LIBRARY

"THE outstanding contribution which our country and its government have made to medical knowledge "— In these words of Dr. William H. Welch, the Medical Library Association in a resolution adopted at its 38th annual meeting, aptly characterizes the U. S. Army Medical Library and the *Index-catalogue* which it issues. The Medical Library Association in this resolution given herewith urges the Congress of the United States to appropriate adequate funds for the maintenance and growth of the collection of books and the preparation of the *Index-catalogue,* which Major Edgar E. Hume, present librarian of the Surgeon General's office, calls " The most comprehensive piece of bibliography ever attempted in any field of knowledge."

In 1840 the Army Medical Library was started for the purpose of stimulating interest in medicine among army surgeons. In 1868 Dr. John S. Billings became librarian and, with a vision seldom found, started to build up this monumental collection and the accompanying catalogue. He labored for over 25 years in this field and succeeded in that time in making this library of indispensable service to the medical profession not only of the United States but of the entire world. Dr. Billings's conception of the library was that it should disseminate knowledge of medicine as well as catalogue it and his catalogues and bibliographies have become the means for such dissemination. It is not too much to say that every physician and public health worker in the United States has profited and is profiting by the vast fund of knowledge made available to teachers and research workers as well as to the humblest practising doctor in the country through the bibliographies published from time to time under the heading *Index-catalogue.*

Since Congress has adopted a somewhat niggardly attitude toward the library, it behooves all of those interested in better health for the individual and the community to support the resolution of the Medical Library Association. The conception of the library, created by Dr. Billings and forwarded by Dr. Fielding H. Garrison and Dr. Robert Fletcher, has been carried on by successive

librarians in recent years. Attempts have been made to combine this library with the Library of Congress but, in the opinion of those who know the Surgeon General's Library best, such a combination would be disastrous to best bibliographical work in the field of medicine.

The publication of the *Index-catalogue* is naturally dependent upon the availability of books and periodicals in all languages that present material suitable for listing in the *Catalogue*. The publication of such a work is very expensive. One thousand copies of each volume are printed and cost between $18,000 and $19,000 merely for the printing. The work of preparation increases the cost to more than $30,000 a volume.

Like other libraries, the Army Medical Library has had difficulty in maintaining its shelves and personnel during the depression. Appropriations for books have been cut from $20,000 annually to less than $15,000 and this, coupled with the fact that the purchasing power of the American dollar in European countries has fallen considerably, makes the appropriation even smaller. Funds are needed for books to fill the gaps left vacant during the last 5 years and to buy new publications and periodicals recently issued. Cataloguers and other personnel are expensive, and money for this purpose is needed. The total amount, however, is an insignificant sum compared with the hundreds of millions and billions being appropriated for other army and navy purposes and for a great variety of other projects.

Readers of the *American Journal of Public Health* are urged, therefore, to present the important matter of maintaining the Medical Library of the Surgeon General of the U. S. Army to their senators and congressmen before the next session of Congress. Most of these men have no conception of the real significance and value of this great collection of books and of the *Index-catalogue*. It ought not to be difficult for medical and lay public health workers to make congressmen feel that an adequate appropriation for the Surgeon General's Medical Library is essential to the health and well-being of every citizen in the country. Let us mass public opinion to support this, the greatest medical library in the world.

RESOLUTION RECOMMENDING THE APPROPRIATION OF ADEQUATE FUNDS FOR THE MAINTENANCE AND GROWTH OF THE ARMY MEDICAL LIBRARY'S BOOK COLLECTION AND INDEX-CATALOGUE.

The Medical Library Association, comprising two hundred of the medical libraries of the United States and Canada, assembled in its thirty-eighth annual session in St. Paul, June 22, 1936, notes with pleasure and pride the appearance of volume one of the Fourth Series of the *Index-catalogue* of the Library of the Surgeon-General's Office, United States Army (Army Medical Library). The Association records with satisfaction the abbreviations and changes in composition in this new volume effecting a saving of twenty per cent in space with accompanying reduction in cost.

After a delay of three years during which no volumes of this *Catalogue* were printed, the appearance of this first volume of the Fourth Series gives renewed assurance of the continuation of this publication, which, together with the Army Medical Library, is considered the outstanding contribution which our country and its Government have made to medical knowledge, and

WHEREAS, The value and usefulness of the *Index-catalogue* is dependent upon the completeness of the files of medical publications contained in the Library of the Surgeon-General's Office—a public, national, medical library, the greatest in the world, serving in its present form of administration with satisfaction the medical profession and the medical libraries of our country, and

WHEREAS, In recent years the annual appropriation of the Congress has been wholly inadequate to provide sufficient funds to acquire the current medical books and periodicals issued throughout the world, so that they might be available for use throughout the country and for inclusion in the *Index-catalogue,* therefore be it

RESOLVED, That the Medical Library Association urges the Congress to appropriate annually to the Library of the Surgeon-General's Office an adequate sum for current medical books and periodicals and for the purchase of back publications lost during those recent years when the amount granted was grossly inadequate, thus depreciating the completeness and usefulness of the Library's collection; and an additional sufficient sum annually, for as many years as may be required, in order to make for the greatest possible completeness of the collection and its *Catalogue;* and be it further

RESOLVED, That a sum be appropriated annually to defray the cost of printing regularly each year not less than one volume of the *Index-catalogue,* and be it further

RESOLVED, That a copy of these resolutions be spread upon the minutes of the annual meeting of this Association and sent to the President of the United States, the presiding officer of both houses of Congress, the Secretary of War, the Surgeon-General of the Army, and to the national, state, and other medical periodicals with a request for publication, and to the members of this Association, urging the organization of which they are a part and all other medical associations and institutions to adopt similar resolutions to be sent to their local members of Congress requesting their support of these measures.

Preprinted from the *Bulletin of the Medical Library Association,* Vol. 25, No. 1, p. 12, September, 1936. Minutes of the Thirty-Eighth Annual Meeting, Session of June 22, 1936.

DR. CHARLES PORTER

PUBLIC HEALTH, Volume 50, No. 1, October, 1936, appears in a new dress and under a new editorship, Dr. Charles Porter, who has served as Honorary Editor since 1925, having retired. The new editor pays a well deserved tribute to him, pointing out that he had a real gift for journalism in the best sense of the word, and succeeded in endowing the pages of *Public Health* with character and dignity. He calls him the last, for the time being, of a line of distinguished editors, including such men as Sir Arthur Newsholme, Sir Shirley Murphy, and R. A. Lyster. Dr. Porter's editorship was interrupted for one year by his election as President of the Society of Medical Officers of Health of England.

It may be said with a high degree of certainty that readers not directly concerned with affairs of the Medical Officers of Health or with health administration in England, always turned first to the section headed "*Ut Ita Dicam*" (Being Comments, apropos and otherwise, on Sundry Matters). Here we had a running comment on practically every matter of interest in public health in England which had taken place during the preceding month. The writing was excellent and touched off with the wit that was characteristic of Dr. Porter. It is no disparagement to the new editor to say that this will be missed.

The arrangement of the Journal has been changed and a new cover adopted. It is interesting and covers affairs in England quite well; but if we may judge from the first issue, it will be devoted more strictly to summarizing the majority of papers read at meetings and to official affairs. It is planned, however, to ask for special articles reviewing new legislation and recent advances in the particular aspects of preventive medicine.

Our readers will remember the excellent letters in our *Journal* which came from Dr. Porter's pen. A year ago he found it necessary to discontinue these and they have been missed. For Dr. Porter we wish every good thing in life and assure him that he will be missed.

SOUTHERN BRANCH OF THE AMERICAN PUBLIC HEALTH ASSOCIATION

THE Fifth Annual Meeting of our Southern Branch, held in Baltimore, Md., November 17–18, was in every way a great success. The attendance was by odds the largest at any meeting so far, with some 360 registrations. The quality of the scientific papers was very high. Speakers were attracted from various parts of the country, in addition to those who hold membership in the Southern Branch.

The arrangement of the program was made in conjunction with the officers of the Southern Medical Association, so that the sessions of the Public Health Section of the Southern Medical Association fitted in with those of our Southern Branch, making as it were one continuous meeting on public health, which could be attended by all interested in such subjects, since there was no duplication in hours and practically none in subjects.

Among the special features may be mentioned the Presidential Address by Dr. I. C. Riggin, State Health Commissioner of Virginia. This was a summary of the situation regarding poliomyelitis from the beginning of the 1935 epidemic up to the present time. It was followed by a description of the epidemic in Alabama in 1936, by Dr. Baker, State Health Officer, after which Dr. Charles Armstrong, of the Public Health Service, gave the results of his studies on the use of picric acid spray as a preventive of the disease and his results in Alabama. This paper will be given in full in our pages in an early issue. We can only say here that it seems to offer the best hope we now have for the prevention of this dreaded disease. It was listened to with marked attention, and further studies will be carried out.

All of the meetings were well attended, the large room assigned being packed at times until there was only standing room. Needless to say, members of the Southern Medical Association attended our sessions in considerable numbers and, as already said, the combination of the two bodies had all the appearance of a continuous meeting on public health, in which both societies took apparently an equal interest. It goes without saying that many members of the Southern Medical Association are members of the American Public Health Association and also of our Southern Branch.

We cannot speak too highly of the arrangement which has been in effect for several years, that is, several smaller societies holding their meetings in conjunction with the Southern Medical Association. In addition to our Southern Branch, other societies concerned in public health also had their meetings. The National Malaria Committee, in which we are all interested, and the American Society of Tropical Medicine had their sessions in Baltimore, both with valuable papers of interest to all health officers and health workers. Indeed there was intellectual food for all, which it will take many months to digest, and all present are looking forward eagerly to the publication of the papers as matters of permanent record.

The weather was all that could be desired, sunshiny and cool. The people of Baltimore were most gracious in their hospitality. The new Fifth Regiment Armory, in which the meetings took place, was spacious and was most admirably arranged, not only for the scientific sessions but for the scientific and commercial exhibits, of which there were a very large number. It is needless to speak of

the social side of this meeting. The fact that it was in Baltimore carries assurance that it was delightful in every way, being in this beautiful old city with many points of historical interest dating back to the beginning of our country. On every side there were streets, monuments, and buildings carrying names familiar to everyone who has read the history of the foundation of our country. To the people of the city of Baltimore, we owe gratitude.

PUERPERAL FEVER

THE House of Lords of England on July 14, 1936, handed down a judgment on an interesting case in which there is a lesson for us in America.[1]

In January, 1933, Mrs. M. arranged for a private ward for her confinement in the Maternity Home of 16 beds maintained by the Lindsey County Council. She went to the Home on July 12 and, there being no private ward available, entered the public ward. On the 13th she was confined. On July 14, four other patients developed puerperal fever, and on July 17, Mrs. M. became acutely ill with the same infection, but finally recovered. On this date, at the instance of the medical superintendent, the home was closed.

In November, 1933, Mrs. M. brought suit against the County Council for breach of contract; for negligence in not closing the ward on the occurrence of a case of puerperal fever on July 4; and for negligence in failing to inform her, her husband, or her medical adviser that there had been such a case. She won, and judgment was entered for her in the sum of £750, with costs. The Court of Appeal, with one dissentient, affirmed the finding on February 8, 1935. On July 14, 1936, the House of Lords dismissed the appeal of the County Council against this decision. The Lord Chancellor accepted that the jury was justified in holding that without taking swabs there was a grave risk that a carrier might be present, and that until that risk had been eliminated, it was dangerous to admit a new patient to the Home. He held also that if new patients were admitted before the presence or absence of a carrier on the staff had been determined, the doctor in attendance should be informed of the facts and allowed to decide whether his patient should enter the Home, or to decide on what precautions should be taken if the patient were admitted.

It seems then that it is a neglect of duty on the part of a maternity home on the occurrence of a case of puerperal fever (1) to admit any patient to the home without first taking swabs from the staff, and (2) to fail to inform the patient, her husband, or her doctor of the occurrence of a previous case in the home.

Comments on the public health aspects of this case in the *British Medical Journal*[2] say it is a common practice to comply with the first requirement, and hold that it is apparently advisable to do so in all cases, just as there are now examinations for the presence of the Klebs-Loeffler bacillus, X-ray pictures of injured limbs, etc., in order to protect the attending practitioner rather than in the strict interest of the patient. The second requirement offers greater difficulties, as there is no indication of the length of time over which the giving of this notice should extend, or as to whether the necessity of making such a declaration is voided by swabbing, excluding any members of the staff, disinfecting the premises, closing the ward or the entire home, etc. It is held that it is not in the

interests of the patient to submit to her a complete history of the infections that have occurred in the home. It is suggested that it might be well to inform the attending physician and let him make the decision, but that this might lead to his appearance as a defendant.

The history of the case is most interesting and instructive. Certainly some things in England are better managed than in America, though the time taken for the decision by the House of Lords reminds us of the delays in our American courts.

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2. *Brit. M. J.*, Supplement, Aug 1, 1936, p. 100.

PRESENTATION OF WALTER REED MEDALS

THE meeting of the American Society of Tropical Medicine, held in Baltimore, Md., November 18–20, was made notable by the presentation of two medals. After telling the story of the conquest of yellow fever, which was brought about so largely by the work of Major Walter Reed of the United States Army, a gold medal was presented by proxy to his widow. It was received by Major General Walter L. Reed, Inspector General of the Army, the son of the man in whose honor this series of medals has been named.

We need hardly remind the readers of this *Journal* that Major Walter Reed died before our government had given any proper recognition to the work of which he was the head, either to himself, the members of his committee, or to the volunteers who risked their lives for the benefit of humanity.

The other Walter Reed Medal was presented to the Rockefeller Foundation in recognition of the work which has been carried on by them in practically every part of the world for the eradication of yellow fever, which is now so well advanced.

PUBLIC HEALTH EDUCATION*

Fifteenth Anniversary Overlooked—Quite without remembrance by even those most concerned, the 15th anniversary of the Public Health Education Section came due in October.

In the spring of 1921 a letter was addressed to A. W. Hedrich, then executive of the A.P.H.A. with headquarters in Boston. The letter suggested that health education be given space on the program of the Annual Meeting to be held in New York the following October.

Mr. Hedrich replied to this effect. "Why not? Go to it." And so two sessions were planned, and the attendance was so large and representative that a provisional section was organized with Dr. Lee K. Frankel as the chairman. After a year or two the Section was made permanent, and here we are, having passed the 15th anniversary of those first meetings in a ballroom of the Hotel Astor in New York City.

Possibly next year some of the committees authorized at New Orleans may assess the past, and attempt a glimpse into the future.

We Are Discussed—At New Orleans the "Use of the Department in the *Journal* Devoted to Health Education" was the subject for a luncheon session.

A report was presented on the extent and nature of the material in this department of the *Journal*, in earlier years called "Education and Publicity," and now known as "Public Health Education."

Mr. Routzahn raised questions as to the content of the department, and it was agreed that the Section should have a committee to study the matter, and to give some coöperation.

In One Hundred and Fifty-six Issues—This department started in the issue for July, 1923. Including Oct., 1936, it has appeared in 156 issues, with none in two issues of 1924, and in one each of 1929 and 1935. Dr. H. E. Kleinschmidt edited one issue. The size range runs from 1½ pages to 10 pages in an issue, with an average of 8 pages in the 1935 and 1936 issues, and a total of 779 pages.

What We Try to Talk About—In this department we try to offer practical help to workers in varying types of health agencies. We try to suggest and illustrate new materials, new methods, new audiences. A wholesome questioning is encouraged as to what we have always done and the ways of doing things. We try to have many people represented in what is mentioned and what is quoted. What someone has said or done is usually the text for any comment or suggestion. This includes the repetition of commonplaces and abc's. But there are always new crops of readers coming along.

To the thousands of health agencies represented by readers of this department we have tried to offer a fairly complete list of new helps, new materials for health education and publicity. But we are limited to the information which reaches us.

And many good ideas and useful

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

materials are hidden under the bushel of the state or city of their origin.

Our Little Crusades—We have talked about indexes and tables of contents, and awarded honorable mention when included in annual reports. We have urged that editors be told when we like what they publish about health, and that radio stations learn what we think of their handling of health topics. We have tried to explain what " discussion " really is in a convention program, and how to bring it about. We have asked for criticism of what has been published. We have pleaded for comebacks from our readers.

What of the Future?—None of the questions raised at the New Orleans luncheon were answered. What don't you like? or what do you believe is least useful? *If* you *could* get what you wanted, what would you like in this department? If they could get what they wanted or what they needed, what would that be? How can the editor secure what national agencies now fail to supply? How can he secure what is received from state and local sources?

How can we organize group editorship to take over the coöperative educational opportunity offered by this department?

Health Education at New Orleans—That none may overlook the part of health education in the New Orleans meeting of the American Public Health Association, the record is briefly reviewed.

In a special session, " Advances in Public Health," Dr. William P. Shepard presented " Recent Progress in Health Education Methods."

Health Officers Section had " The Need for and Value of an Intensive Program of Health Education in State Health Departments," by Dr. Felix J. Underwood.

American Association of School Physicians devoted part of a session to " Health Education," by Fannie B. Shaw.

The Public Health Education Section had three luncheons, one dinner, two half-day sessions, and one joint session with Child Hygiene Section.

The technical exhibits contained a measure of health education value; there were extensive scientific exhibits, and Health Education and Publicity Headquarters.

Motion pictures and lantern slides were shown as features of several programs of the convention, and pictures were scheduled at the close of Public Health Education Section meetings.

A broadcast of the American Medical Association was received in Exposition Hall, and numerous broadcasts were given over local stations during the week.

Exhibits, Scientific or Otherwise—The Scientific Exhibits have become an important feature of the Annual Meeting . . . even though not all of them are scientific . . . and some are not exhibits . . . for unhappily the term " exhibit " calls for a reasonable measure of graphic presentation . . . which is absent from a mere aggregate of words and numerals . . . but the graphic is winning its way . . . even though many of the nearby technical exhibits are merely booths filled with many things.

The editor would like to comment on some of the exhibits, but the space had better be given to other delegates who were at New Orleans. The first speaker is—your name, please!

Health Education and Publicity Headquarters—Wall material came from various sources for the display at New Orleans. Classified portfolios were supplied by Social Work Publicity Council, 130 E. 22d St., New York, N.

Y., with other portfolios from health agencies and commercial groups.

The collection was classified as follows:

Annual reports; campaigns; house organs; bulletins; meetings; newspapers; radio; dramatic material; exhibits and expositions; money raising, letters of appeal; magazine articles; pictorial publicity, photographs, maps, diagrams, visualization, motion pictures, strip film, posters; printed matter, mimeograph, offset; health education, school, adult; health topics; periodicals; city and county; state; national; commercial; unclassified (including syphilis in press and radio).

These portfolios may be consulted at any time at the Council's headquarters in New York City.

Movies at the Annual Meeting—There ought to be a chance for health workers to see new motion pictures and other projection material. So far no satisfactory plan has been worked out. Suggestions would be welcomed by the Program Committee.

The following pictures were available at New Orleans:

"Sylvatic Plague" and "Psittacosis," by Dr. K. F. Meyer, University of California, San Francisco, Calif.

"Malaria," by Winthrop Chemical Company, New York, N. Y.

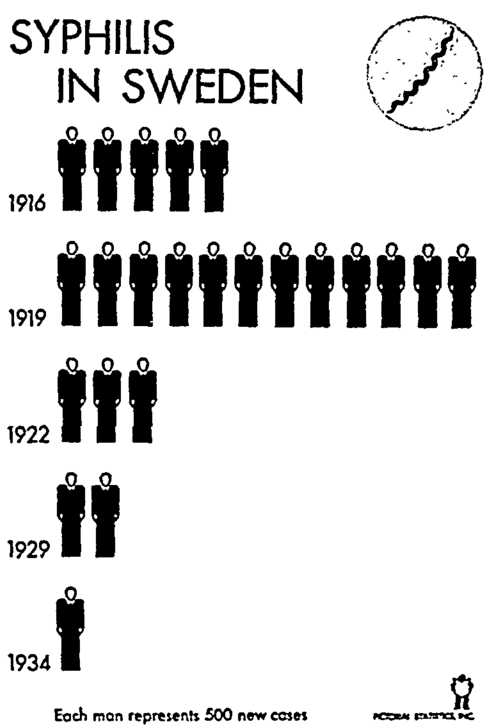
"Behind the Shadows," by National Tuberculosis Association, New York, N. Y.

"For All Our Sakes," a talking slide film by American Social Hygiene Association, New York, N. Y.

More Than Six Million Readers—And the end is not yet for the *Survey Graphic* article on syphilis, "The Next Great Plague to Go," by Dr. Thomas Parran. The article appeared in *Survey Graphic,* July, 1936. In abbreviated form it appeared in *Reader's Digest.* The *Graphic* reprint has reached 35,000 circulation. The *Digest* reprint approximates a 300,000 circulation. Here we have a total of nearly 2,300,000. Recently a rough count was made of the circulation of newspapers which carried the gist of the material in news or editorial columns. The grand total runs above 6,000,000.

This article seems to be a "natural" which we are wise to play for all it is worth. The *Digest* reprint (address at Pleasantville, N. Y.) is cheap, light, and small, and so is good for fairly wide circulation. The *Graphic* reprint is fuller in treatment, on better paper, better illustrated, more dignified in appearance. It should impress editors and broadcasters, program committees of clubs, leaders in the community. Single copies, *10 cents,* and *8 cents* down to *5 cents* in quantities.

The picture charts may be displayed at various times and places. In letter size, *20 cents* for the set; 17 by 22 inches, *50 cents.* The larger size should be useful at state conferences of social work, and at many kinds of



From Survey Graphic Magazine, July 1936
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state conventions. Better add a card telling how to get reprints or charts.

The charts might be reproduced in a monthly bulletin or elsewhere. Before doing so please write for permission and the credit line which should accompany any reproduction. Address: *Survey Graphic*, 112 E. 19th St., New York, N. Y.

" The Health Officer " for November—A good budget of health education material appears in the November, 1936, issue of *The Health Officer*. *Free* from U. S. Public Health Service, Washington, D. C. But we do wish that mechanically it could be made more legible. There is too much of too small type; too much space between letters and between words; italics, on page 235; many of the lines too long for the size of the type.

" Posters Picture Public Health " announces a group of posters produced by the Federal Art Project, W.P.A., New York City. These silk screen posters come through Dr. W. H. Runcie, Board of Health, Hempstead, N. Y. *10 cents* each; less in quantities.

" The Press and Poliomyelitis " is a careful review of newspaper clippings received last summer reporting use of Armstrong-Harrison nasal spray in an outbreak in several southern states. The article might well furnish material for a special memorandum to editors in a like situation.

" Publicizing Public Health," by Dr. C. C. Slemons explains the expanded program of Michigan State Department of Health. Says Dr. Slemons:

When public opinion gets in step with the expanding public health program, then will practical application of public health service be more nearly correlated with current scientific knowledge. Thus arises the urgent need for a concerted effort on the part of public health agencies not only to inform a passive public of the negative values of disease prevention and of positive health measures, but to carry forward the story of public health that the public will actively demand the best possible health protection for every individual.

Recognizing this passive attitude toward public health and the immediate need for active coöperation, the Michigan Department of Health inaugurated this year an educational news program designed to maintain a continuing contact with the public in the interpretation of public health activities and conditions. A full-time trained journalist has been placed in charge of publications and a news service established under the administration of the Bureau of Education. Through this bureau, then, is correlated all news releases to both the lay and the professional press pertaining to the activities of the various administrative bureaus of the department and to local health conditions, as well as all literature designed for positive health education.

One feature of this program is

A series of news releases sent out each week to more than 400 daily and weekly newspapers of the state. In addition, these articles are sent to all of the full-time health officers of Michigan, to the *Michigan Municipal Review*, and to the established news syndicates in the state. The number of articles each week varies from one to several, but it has been found that better coverage is obtained by concentrating upon a single effective release. Every effort is made to meet special requests from editors and from daily reporters for " feature " articles concerning the policies and program of the health department. More timely news " breaks " are released immediately to the daily press through the capitol press bureau.

These articles are written for the newspaper-reading public in the typical news fashion—brief, timely, simply told, and as interestingly written as possible. Naturally, since they interpret state-wide health conditions, the articles are broad in scope, and, hence, lose some of the local appeal that an editor may demand. This is offset to some extent through the coöperation of the local health officers who are urged to correlate local data with our releases in making them more newsworthy for the local press.

The sending of these news releases to the local health officer serves a two-fold purpose. Not only are we providing him with materials and ideas for publicizing the health program, but we are also building for a

cordial relationship between local and state departments. Since the foundation of any public health service lies in the direct services rendered by the local health department, the cause of public health will be advanced to the degree that we can aid such departments and stimulate a demand for a trained health organization in every community.

" A Story of Yellow Jack " tells of a Memphis revival of the professional play, "Yellow Jack," and reproduces a newspaper article used in the promotion of the play.

The Industrial Nurse Teaches—The nurse in industry may do an extensive teaching job as outlined by Lucy DeMuth in " Health Teaching in the Small Industry."

Then there are bulletin boards for the nurse to utilize:

Bulletin boards throughout the plant may be used for safety instruction, while those in the dressing-rooms may be concerned with matters of health. The use of bulletin boards is of particular advantage where women are employed. The supply of material for this purpose is almost limitless. It can include every subject from the care of the hair and the nails to the latest research on cancer. Excellent articles appear almost daily in our current magazines, nursing literature, and newspapers. Very often they are lengthy and written in terms difficult for the average shop worker to interpret, but they can be excerpted or rewritten in a simpler form.

Many organizations throughout the country distribute without cost pamphlets and bulletins on health. Pamphlets that are too lengthy may be kept in the first aid room to be distributed to interested individuals. A list of this reading material may be kept posted on the bulletin board. To create interest in health information the employees may be encouraged to bring in articles they have found interesting. If these have news value, they can be placed on the board for others to read.

In *Public Health Nursing,* 50 W. 50th St., New York, N. Y. Oct., 1936. *35 cents.* .

Hygeia, November, 1936 — Published by A.M.A. at 535 N. Dearborn St., Chicago, Ill.

The plight of the hospitals (insurance complications) . . . " Willie, pull your stomach in! " (posture) . . . Public safety a world ideal . . . Some vignettes from tuberculosis history (Welch, Biggs, Osler, Trudeau) . . . Carbon monoxide poisoning (" artificial respiration is easy ") . . . It depends on the weather (effect of climatic conditions) . . . Winter insects versus health . . . Albert Neisser (discoverer of the cause of gonorrhea) . . . Broken bones . . . The doctor abroad—Italy . . . James Watt, inventor of the spirometer . . . Green vegetables all the year . . . Curious stories about health (about Captain Cook) . . . Eavesdropping on the doctor: a case of pneumonia . . . The meningococci (another germ we live with) . . . The transparent woman (the model of a woman) . . .

In " School and Health ":

Physical growth as a cause of adolescents' problems . . . Teaching health in a new college (Rollins).

What the Newspaper Syndicates Offer—Some 21 writers of newspaper health columns are reported in *Editor and Publisher Thirteenth Annual Directory of Features.* The authors, as listed: Dr. Louis Berg; George W. Crane; Dr. Edmund B. Chaffee; Dr. Cutter; J. J. Gaines, M.D.; Marie Craig, R.N.; Jane Stafford; Dr. Morris Fishbein; Dr. Sophia Brunson; Dr. Logan Clendening; Laurie (health exercise); Dr. Iago Galdston; Dr. William Brady; Dr. Louis E. Bisch; Dr. Foster D. Snell; Dr. Major G. Seelig; Dr. James W. Barton; Dr. James Barton; Dr. C. N. Crisman; Dr. Royal S. Copeland; Beulah France (" Your Nurse Says "). *Editor and Publisher,* Times Bldg., New York, N. Y. Sept. 26, 1936. *10 cents.*

" Great Pox " in Time—Under this heading is reported Dr. Parran's becoming president of " that ancient and honorable organization " which " convened for its 65th annual meeting " in New Orleans—the A.P.H.A.

The article traces syphilis in the

Second Commandment, and down through the ages until in 1929 the St. Louis *Post-Dispatch* "specifically mentioned syphilis in a report of a St. Louis meeting of the National Society for the Prevention of Blindness." Then follows recent history. But

> Nowhere is this taboo more rigidly enforced than on the screen or in radio. Cinema producers are well aware that any reference to the subject, regardless of good motives or public purpose, will only make trouble for themselves. Columbia Broadcasting will not permit the word "syphilis" to go out over the air from its stations. National Broadcasting this year gingerly permitted Dr. Parran and two other authorities to mention the word in broadcasts.

Portraits of Dr. Rice and Dr. Parran accompany this article in *Time,* 350 E. 22d St., Chicago, Ill. Oct. 26, 1936. *15 cents.*

Health Education in September Journal—The September, 1936, issue of *American Journal of Public Health* contained material of value to health educators.

"Administration of Health Education and Health Supervision in Negro Colleges," by Cornely (pages 888–896).

"What Is the Air Hygiene Foundation?" (page 896) announces a new source of background material. The address was not given.

"Milwaukee's Well Advertised Gastrointestinal Epidemic," by Koehler, pages 921–923, gives the facts about "one of those situations."

"A Great Medical Library," editorial, pages 930–932, is something for all readers to go over. Some newspaper editorial writers would appreciate receiving copies of such material.

"Poliomyelitis," pages 933–934, gives background data likely to be of value.

In "Books and Reports," note comments on "Vitality," page 942, and on "That Balanced Diet," page 947.

"A Selected Public Health Bibliography" includes two paragraph titles, page 950: "Unpleasant Thought-of-the-Month," and "Viewers-with-Alarm Please Note."

Do You Tell Them What You Like?—Why are easily named radio favorites so well paid for their broadcasting? Because so many people wrote, or telephoned, or telegraphed their appreciation.

Why are various men and women permitted to buy and use radio time for broadcasting dubious health information or advertising doubtful or dangerous remedies or treatments? Because so few people have taken the trouble to object to these most dangerous of "public enemies."

Light on the above and on other aspects of "The Art of Pleasing Everybody," via radio, will be found in an article so named in *Atlantic Monthly,* 8 Arlington St., Boston, Mass. Oct., 1936. *40 cents.*

Stream Pollution Exhibit—Executed by a window display firm from designs by staff members, the Washington State Department of Health, Seattle, produced an effective display which has been shown at fairs and expositions.

As described by Dr. A. S. Baker, health education adviser:

> The length is 13 feet over all and the height is 8½ feet. The box containing the scene is about 8 feet long, 2½ feet high, and 2½ feet deep.
>
> The scene depicts a mountain background, a city middle ground, and two farms in the foreground, with a stream of running water as a front border (does not show in the picture). In the center a bridge and to the left of this, a pipe (the outfall of the city sewer into the stream) with a sign "Keep Away, City Sewer."
>
> The water in the stream flows from right to left in a metal trough painted to look as natural as possible and containing gravel and pebbles. There is a division in the trough under the bridge to keep the clear water in

the upper end of the stream (right hand side) from mixing with the stained water (representing sewage) in the lower part of the stream (left hand side). The water is kept circulating by two pumps driven by an electric motor mounted under the box. When in operation the two streams appear to mix at the bridge, the outfall sewer pipe pouring its stream of stained (brown ink is used as stain) into the stream at this point. The right hand farm where the water is clear looks prosperous and healthy; the left hand farm is dilapitated, run down, and deserted.

The front panels are finished with dark green fabricoid and the lettering is sawed-out-block in white.

Dr. Baker will loan a photograph to show the general effect.

Child Health and Health Education—One of the educational services of the American Child Health Association was the preparation of carefully classified and annotated reference lists to suggest some sources of reliable, helpful and inexpensive material on various aspects of school health work. This particular service will be continued during the coming year.

The lists are organized in relation to problems confronting administrators, supervisors, teachers, physicians, nurses, and others engaged in school health education.

Single copies of mimeographed or printed reference lists are available to these leaders free of charge. Address: School Health Education Service, 1201 16th St., N.W., Washington, D. C. A set, or individual lists will be sent on request.

"Health Education in Elementary Schools." Mimeographed. Revised. January, 1936. 6 pp. Procedures outlined, references given for specific steps in the development of health education activities in the classroom.

"Health Education—A Brief Bibliography for Administrators and Instructions of Health Education in the Junior and Senior High Schools." Mimeographed. Revised. March, 1936. 5 pp. Contains classified, annotated references including recent articles in professional periodicals.

"Some References on Child Care and Training." Mimeographed. Revised. June, 1936. 6 pp. Prepared for instructors of child care classes in secondary schools and for Parent-Teacher groups.

"Some References on the School Lunch." Mimeographed. January, 1936. 5 pp. An annotated list of references classified under the following headings: general references; organization and management; educational uses of the school lunch; the school lunch and the relief program.

"Health Plays for School Use." Mimeographed. Revised. January, 1936. 6 pp. An annotated list of plays selected with reference to age groups.

"Health Education in the Rural School." Mimeographed. January, 1936. 6 pp. Selected list prepared especially for teachers and parents in rural communities.

In general these lists are suggested as models for consideration by all who make up lists of reading references. The form of the references, and the types of information given will be helpful for a half dozen references, or less, as well as for the extensive bibliography.

The present editions of the child health bibliographies lack some street addresses which might easily have been included. Also there is some needless mention of Government Printing Office in addresses for government publications.

(The inclusion of street addresses is suggested: (1) to cut down the cost of government; (2) to save time in the delivery of mail; (3) to make more sure the correct delivery of mail to some addresses.)

HEALTH EDUCATION

The references below, on adult or child health education, are taken from *Health Index*, National Health Library, 50 W. 50th St., New York, N. Y.

Fitzpatrick, M. V., R.N. Health education coördinated. *Public Health Nursing* (New York City) 28:451–54, July, 1936. Health program in an elementary school told by the school nurse.

Greenman, R. H. Helping the doctor. National Tuberculosis Association, *Bulletin* (New York City) 22:118–19, Aug., 1936.

Kniberg, E. G. Classroom health activities. Part II. *Public Health Nursing* (New York City) 28:467–70, July 1936 (concluded).

Lloyd, W. M., M.B., D.P.H. Health and physical education. *Medical officer* (London) 55:207–8, May 23, 1936. Need for "an organized (not spasmodic) system of health education."

Neuhoff, F. A. Illinois dental health education program. *Bulletin of the Chicago Dental Society* (Chicago) 16:5–7, July 2, 1936.

Scott, J. A., M.D., D.P.H. Health education and the work of the National baby week council. *Medical officer* (London) 56: 267–68, July 4, 1936.

Stamp, Lady. Winning the mind. Presidential address. *Journal of the Royal Sanitary Institute* (London) 57:189–92, Oct., 1936. Address at health congress on teaching women about health.

Stimson, Mabel. Utilizing the food clinic in community education. *Hospital Management* (Chicago) 42:25, 60, Aug., 1936.

Teschner, P. A., M.D. Doctors and public speaking. American Medical Association *Bulletin* (Chicago) 31:131–34, June, 1936. American Medical Association offers to physicians a loan library of clipping collections from *Hygeia* for use in preparing health education talks.

FOR EDUCATION AND REFERENCE

One or another of the items listed below may prove useful if but a single copy is sent to the right person in your city or state.

"Altro Becomes of Age." Questions and answers about the workshop for tuberculosis patients after their discharge from the sanatorium. Committee for Care of Jewish Tuberculous, 71 W. 47th St., New York, N. Y. *Free.*

"Conservation of School Children's Eyes," by A. C. Snell. Tuberculosis and Health Assn., 277 Alexander St., Rochester, N. Y. *Free.*

"Diets to Fit the Family Income," by R. S. Carpenter and H. K. Stiebeling. A popularization of an earlier study, adapted to four income scales, thus giving it unusual value. Dept. of Agriculture, Washington, D. C. *Free.*

"A List of Dental Educational Material." Fall of 1936. Bureau of Public Relations, American Dental Assn., 212 E. Superior St., Chicago, Ill. *Free.*

"List of Publications," Social Work Publicity Council, 130 E. 22d St., New York, N. Y. *Free.*

"On the Witness Stand: The Evidence on Compulsory Health Insurance," by J. W. Walch. The author was for it; he studied the subject; now he is against it, and asks and answers 107 questions. Medical Society of State of New York, 2 E. 103d St., New York, N. Y. *10 cents.*

"Vitamin D Milks," by J. A. Tobey. The author, care of Borden's, 350 Madison Ave., New York, N. Y. Reprint. *Free.*

From U. S. Children's Bureau, Washington, D. C.:

"Mortality Among Prematurely Born Infants," by E. D. Dunham (reprint).

"The Social Security Act and Crippled Children," by M. M. Eliot (reprint).

From State Charities Aid Assn., 105 E. 22d St., New York, N. Y. (*free*):

"The Modern Background of Syphilis Control," by J. E. Moore.

"Continuity and Growth of the State Department of Health" (and their bearing on local and federal health administration), by Homer Folks.

From American Medical Assn., 535 N. Dearborn St., Chicago, Ill.:

"Athlete's Foot," by D. D. Levine. (*Hygeia* reprint.) *5 cents.*

"Home Canning for the Diabetic," by F. H. Diamond. (*Hygeia* reprint.) *5 cents.*

"The Skin in Health and Disease," by H. N. Cole. (*Hygeia* reprint.) *15 cents.*

"What to Do for Blind Children," by Park Lewis. 29 pages. *10 cents.*

"The 'Compatible Eating' Fad," by C. W. Lieb. (*Hygeia* reprint.) *10 cents.*

"Glands: Their Influence on Body Build and Behavior," by H. S. Rubenstein. (*Hygeia* reprint.) *15 cents.*

BOOKS AND REPORTS

Cash Relief—*By Joanna C. Colcord. New York: Russell Sage Foundation,* 1936. 263 pp. Price, $1.50.

This book is a genuine contribution in the field of social work since it presents facts concerning a much discussed subject. There has been a growing belief that cash relief was to be preferred to commodity relief, but there were no data available in the United States to substantiate that opinion. Miss Colcord has supplied the facts.

In her search for evidence Miss Colcord made a study of the growth of cash relief since 1930. This was done through a searching analysis of the systems of cash relief in Baltimore, Cleveland, Denver, Detroit, Los Angeles, New York City, Philadelphia, Pittsburgh and San Francisco.

This study has dissipated the fear among social workers and laymen that there would be a misuse of cash grants, resulting in frequent demands for more aid and a refusal to take work when it was offered. The evidence favors cash relief and reveals many of the abuses connected with the order system in which there is overcharging, discourteous treatment, the sale of inferior merchandise, and short weights in many instances. It is possible for the client under the cash system to take advantage of sales and select better food in keeping with his cherished food habits. The Relief Administration favors cash relief since it reduces office expenses and the number of complaints, and leaves more time for the professional staff to make investigations and create a desirable client-visitor relationship.

Human nature is the chief value in social work. There is much concern over the effects of relief of any kind on the mental health of the client. This study provides facts that may be used in considering the mental as well as the physical health of the client. The trained worker realizes that he has not succeeded with a client unless he leaves the client thinking well of himself. Cash relief helps to maintain self-respect. Commodity relief provides an opportunity for merchants to play with self-respect. There is nothing quite so important in the life of the person as his own opinion of himself.

This study can serve as a point of departure for further research in which case studies can be made regarding the effect of the various methods of relief on the human nature of the client.

L. Guy Brown

Official Report of the Sixth National Training Conference of Scout Executives of the Boy Scouts of America, *New York,* 1936, 990 pp.

The commission report on health and safety, embodied in these transactions, is of interest to public health workers. The Boy Scout program reaches over a million boys and approximately 230,000 volunteer leaders every year. An actively functioning, properly organized and adequately trained Health and Safety Committee is the minimum expected of a local Boy Scout Council in the performance of its responsibilities. Coördination of this work with other community health activities is planned. Emphasis is given to the importance of using pasteurized milk in camps. If pasteurized milk is not available, it is suggested that some substitution such as powdered or canned milk be used rather than take the risk involved in the use of raw milk. Belief is re-

affirmed as to the necessity for a thorough physical examination for every boy entering the movement. Suggestions are made for the further constructive development of education in personal hygiene, public health, safety and first aid. IRA V. HISCOCK

Security Against Sickness—*By I. S. Falk. Garden City, N. Y.: Doubleday Doran.* 423 pp. Price, $4.00.

In the current controversy over the social security issue, both those who favor and those who oppose social insurance programs in the United States point to the results of European experience in support of their claims. It is also contended by both sides that American social security programs, as embodied in the "Social Security Act" or the "Majority Report of the Committee on Costs of Medical Care," have ignored the results of such experience. In light of such contentions the volume reviewed here should provide a most welcome addition to the literature on this subject. Dr. Falk's experience in the field of public health, his work in connection with the researches of the Committee on Costs of Medical Care, and his wide familiarity with European programs of sickness and health insurance eminently qualify him for this authoritative survey of health insurance programs abroad and their interpretation to the American public.

The book is divided into 3 parts. In the first and introductory part the author deals with the need for group payment of medical costs in the United States. He points out that group payment is no new venture even in this country, where it exists in the form of charity, the sliding scale of the physician, in the form of taxation, or even in insurance. The issue is not, then, the individual fee system *or* the group payment plan, but rather the extent to which group payment shall develop and the form which it shall take.

The second part of the book is devoted to a detailed analysis of the administration, organization, and costs of health or sickness insurance in Germany, Great Britain, France, and Denmark. These countries were chosen because their programs have been developed to suit widely varying conditions, because they have served as models for many other countries, and because they represent divergent approaches to the problem of sickness insurance. Perhaps the most significant conclusion to be drawn from the whole study is the wide degree of satisfaction felt in each country with its insurance program, in spite of frank admissions of many weaknesses and deficiencies. This, to some, may seem surprising in view of the contention of a number of critics in this country, that health insurance is not popular where tried and that there is increasing sentiment in favor of its abandonment.

In no country did the author find any strong sentiment in favor of the scrapping of a program once started. This seemed also to be the prevailing sentiment of the physicians, as voiced by the leaders in the profession. Instead, it was found that insurance schemes, once started, tended to expand, both as to the extent of the population covered and in the benefits and services provided.

Another significant trend was the tendency for compulsory to replace voluntary social insurance. Even in Denmark the system is voluntary only in name. Important also, in view of the cry in this country of "state medicine" or "public medicine," was the fact that in not a single country studied was there a drift toward "state medicine" if by that term is meant that the state goes into the business of providing medical services to the public. Dr.

Falk finds, on the contrary, that: "There can be no doubt, however, that health insurance has operated to strengthen the position of the private practice in the insurance countries" (p. 286). In the matter of preservation of the personal relation between physician and patient, free choice of physicians, control by the physician of the professional aspects of the insurance program, and maintenance of the highest professional standards, the physician in the health insurance countries seems to occupy a position of wide independence.

In part 3 of the book, the author attempts to draw some lessons for an American program from European systems as well as from our own experience with workman's compensation legislation. In the last 2 chapters he states the case for compulsory as opposed to voluntary insurance and lays down 19 principles as the basis for an American system of health insurance. The writer feels that compulsory rather than voluntary insurance offers the greatest promise for success. He advocates the divorcing of cash payments from medical service. He believes that health insurance should be extended to all parts of the population to which the costs of medical care and loss of income due to illness are likely to prove a serious economic hazard. The basic problem for solution, as seen by the author, is how to transform costs which cannot be budgeted by the individual, and are likely to prove beyond his ability to pay, into costs which can be budgeted by large groups of people over periods of time, and hence fall well within the individual's ability to pay. Compulsory programs of health insurance, developed by the states with financial assistance and standardizations by the federal government, seem to offer the best solution to the problem.

C. T. PIHLBLAD

Heart Disease and Tuberculosis—*By S. Adolphus Knopf, M.D. Livingston, N. Y.: Livingston Press,* 1936. 108 pp. Price, $1.25.

A glance at the table of contents of *Heart Disease and Tuberculosis* will reveal the scope of this brochure. It epitomizes a life-long experience in dealing with the interrelationships of heart disease and tuberculosis. With 53 figures as illustrations, with 29 major chapter headings and an index, all compressed into 108 pages, it can be readily understood that the author could only cover so broad a subject in staccato paragraphs.

It is a matter of interest that the book was issued by the patients of The Potts Memorial Hospital, and it is for sale through them by The Livingston Press, Livingston, N. Y.

KENDALL EMERSON

Industrial Dust—*By Philip Drinker and Theodore Hatch. New York: McGraw-Hill,* 1936. 316 pp. Price, $4.00.

A bibliography rich in material, United States and foreign, forms the basis of this new book in the field of industrial hygiene. The authors have drawn freely from their own researches and the literature for a sound exposition of the hygienic significance, measurement and control of industrial dust, perhaps the most valuable contribution on this particular subject thus far, especially in the light of present-day agitation for more adequate and proper legislation for the protection of the industrial worker exposed to harmful dusts, the numerous law-suits in which questions pertaining to exposure of employees to dusts and sanitary control of the industrial environment are involved, the increasing interest in the teaching of industrial hygiene, the establishment of divisions of industrial hygiene in state departments of health,

and the many controversial points on the subject being discussed by industrial engineers and physicians.

Coöperation between the physician and the engineer is fundamental in the control of industrial dust hazards. " Design of dust control apparatus is an engineering matter but it is often the physician who finally appraises the success of the control system." With this prefatory statement the authors include in their book chapters on the effects of dusts and fumes upon the human organism, physical and chemical factors in pneumoconiosis, permissible dustiness, and medical control of the dust hazard. The medical aspects are given in order to " help the engineer to understand the manner in which hygienic requirements affect engineering design and operation of dust-control equipment." The book is none the less valuable for the industrial physician, who should be acquainted with the engineering aspects of dust control if he is to understand better and intelligently pass upon the adequacy of the plant's efforts to improve the industrial environment of the worker exposed to harmful dusts and fumes.

In keeping with latest thoughts in the matter of disabling illness due to dust the authors state there is no reason, medical or social, for branding a man with first-stage silicosis as disabled because of the serious harm that may thus be done to both industry and the man, inasmuch as the man is thereby prevented from seeking gainful occupation, and the employer, by hiring such a man, opens the door to suits involving the slightest mishap to the " disabled." It is pointed out that in the British Empire, where silicosis legislation has been in force for some years, only the man with advanced silicosis, simple or infective, is considered disabled.

Permissible dustiness is given for quartz, coal dust, cement and limestone, lead, zinc oxide, manganese; but, according to the authors, there is no authoritative available data which would justify the adoption for medicolegal purposes of standards of permissible dustiness for each harmful dust. Standards may be used as " basic criteria in the design and operation of dust control equipment and as general guides in the appraisal of working conditions," but the authors conclude the use of these figures for medicolegal considerations is unsound because of the limiting factors of mineralogical composition, " dust floods," and industrial selection, involving the process of natural selection of the fittest and the continuous elimination from industry of the unfit.

Pages 80 to 166 give methods of analyzing the extent of dust hazards, including the dust survey, determination of dust concentration, determination of particle size, chemical and mineralogical analysis of dust. Extremely useful information is given for the laboratory worker.

A short chapter on Methods for the Control of Industrial Dusts is divided into 2 parts: (1) environmental or engineering control, (2) personal or medical control. An appeal is made for initial physical examinations and periodic examinations thereafter. Engineering control is divided into 3 groups: eliminating the sources of dust, preventing the dispersion of dust at its source, and providing individual protection.

The book describes the principles and design of local exhaust systems, air-cleaning apparatus, air filters, and finally there is a historical review of the use of dust respirators and air masks, including the methods of testing respiratory protective equipment and filter materials.

The book is well illustrated; its

tables and figures are clear and well edited; and the bibliography is comprehensive. The authors have provided name and subject indices.

The reviewer commends the volume to the industrial physician, the industrial engineer, the industrial hygienist, the industrial nurse, the safety engineer, the public health laboratory technician, the teacher in industrial hygiene in the medical school, and the school of public health, and the health officer.

BERNARD S. COLEMAN

The New Healthy Living—*By C.-E. A. Winslow and Mary L. Hahn. New York: Merrill,* 1935. Book I, 332 pp. Price, $.84. Book II, 460 pp. Price, $1.00.

Among the early health books for classroom use on the market was the New Healthy Living series which was received enthusiastically by teachers and health educators, because they were prepared by two individuals who knew the proper approach in the health education field. Professor Winslow offered the rich health education background and Miss Hahn the successful teacher's ability to select the right material and present it in an interesting, appealing fashion to school children.

After 6 years of success in the supplementary textbook field this series has been revised. The books are very readable for the age of children for whom they were prepared. Simple experiments that can easily be tried in the classroom, anecdotes of famous persons whose success has been achieved by recovered health, the importance of health in every line of service and activity, simple treatment of communicable disease problems, community and home sanitation, state and federal health supervision and services are only a few of the subjects that intrigue the adolescent readers to go on from chapter to chapter.

Physiology is introduced and the subject of mental hygiene is very pleasingly handled. So when they close the books they are ready to put a high valuation on health, concretely and abstractly. Many fine illustrations, an index in both books and a glossary in Book II also make for the excellence of these school books.

ANNA B. TOWSE

Idols and Invalids—*By James Kemble, Ch.M., F.R.C.S. New York: Doubleday, Doran,* 1936. 328 pp. Price, $3.00.

The ills of the flesh are always interesting when they are the ills of famous persons. In this well printed book a Fellow of the Royal College of Surgeons diagnoses the ailments and performs post-mortems on a score of the most celebrated figures in history. He does it exceedingly well, for he has a pleasing style, in which he deftly mixes philosophy with fact, and medicine with history. In Great Britain the book was published under the somewhat apt title, "Hero Dust."

The narratives begin with a study of Lord Byron, whose personality was acutely affected by his lameness, and end with Omar Khayyam, the Persian poet who was a centenarian in the hazardous 12th century. In between, the author describes the medical and psychological histories of Columbus; Judge Jeffreys, whose sufferings from stone led to the Bloody Assizes; Louis XV, and his procession of mistresses; the baleful Borgias; Cleopatra, the brilliant product of centuries of inbreeding; Lord Nelson, the perpetual invalid; Henry VIII, the syphilitic; Queen Anne, the ugly; and Mary Queen of Scots, the comely; Epicurus, the epicurean; the amatory Catherine the Great; John Milton, who was not always blind; and Beau Brummel, who lived for a while in elegance and died in misery.

In the preparation of this interesting book the author has had access to many rare documents. The facts presented seem accurate, and the conclusions drawn from them are reasonable, with one noteworthy exception. The author asserts the generally discarded theory that syphilis originated in America and was brought to Europe by Columbus and his crew. Most authorities seem agreed today that the red plague had existed in mild form in Europe long before the celebrated explorer discovered America and the charms of the diseased maidens of Hispaniola.

Although the general reader will encounter in this enjoyable book occasional words and phrases that are more or less typical of the obscurant terminology employed by medical writers, he will find the book a most entertaining and enlightening one. The sanitarian should find it fascinating.

JAMES A. TOBEY

Slim and Supple—A New System of Swedish Exercises for Young and Old—*By Barbro Leffler-Egnell. New York: Appleton Century,* 1936. 209 pp. Price, $2.00.

This text offers a system of Swedish exercises for women, designed to accomplish the purpose indicated in the title.

This is another of the texts on exercises designed basically to reduce weight and restore the "girlish" figure. The text is profusely illustrated with pictures of the various exercises. The directions are clear. To the layman the purpose of some of them would not be apparent. The specific aim and purpose of each exercise should have been mentioned in connection with each exercise. This has been done in some cases.

Some of these exercises are difficult to do in good "form" unless given under definite personal instruction and careful supervision. Some, especially if unsupervised, would tend toward sacroiliac strain. CHARLES H. KEENE

British Masters of Medicine—*Edited by Sir D'Arcy Power. Baltimore: Wood,* 1936. 242 pp. Price, $3.00.

Close in the wake of *Great Doctors of the Nineteenth Century* comes this other book of biographical sketches confined entirely to the British.

Beginning with Harvey (1578–1657), sketches of a number of men who have made outstanding contributions to medicine down to and including Ernest Henry Starling (1866–1927) are given. The sketches have been written by those who have been attached to the institutions which their heroes made famous. They appeared originally in the *Medical Press and Circular* in a series of articles carrying the same title as the book. They have now been collected in one volume and arranged in chronological order with some additions and minor corrections.

This book has the peculiar value of calling to our attention some names which are all but unknown to the general profession as well as to the public. Notable among these, for example, is Sir John Floyer, who was the first man to count the rate of the pulse and respirations by the minute, having invented what he called the "Pulse Watch" for the purpose. He was also the first to estimate the blood volume and compare it with the body weight, the results being remarkably near to those obtained by modern methods. He also tried a number of very ingenious experiments, was the first to describe emphysematous change in the lung, and to show that spasmodic asthma was due to constriction of the bronchi. His biographer states very properly that his work has never been sufficiently recognized, even in England.

The book is well written and unusually well illustrated. It deserves a place in the library of every physician.

MAZŸCK P. RAVENEL

Quarterly Bulletin of the Health Organisation of the League of Nations, Vol. V, No. 1 (Mar.), 1936.

This issue of the *Quarterly Bulletin* is unusually interesting as it gives a valuable report of the Pan-African Health Conference held November 20 to 30, 1935. While a little late in publication, the material is of great value. There are special reports on yellow fever, plague, malaria, typhus fever, animal diseases communicable to man, etc.

The report on yellow fever is particularly interesting, giving historical reviews of yellow fever in Africa and South America. Perhaps the most striking report is that on jungle yellow fever. There is a special report on yellow fever in West Africa.

Another section is devoted to insects in aeroplanes, on which our own Public Health Service has done valuable work. Bubonic plague is well considered at some length.

The report on animal diseases communicable to man deserves attention. It is apparent that bovine tuberculosis is spreading with considerable rapidity in certain parts of French West Africa and the British Cameroons, and in Northern Rhodesia a very large percentage of the cattle is affected.

There has been no proof in South Africa that bovine tuberculosis is responsible for human cases, though the disease in cattle is just as virulent as in other countries, and the reporter, Dr. P. J. Du Toit, recognizes the transmission which has been proved in other countries.

Altogether, this number of the *Bulletin* is of unusual interest and is worthy of close study.

MAZŸCK P. RAVENEL

BOOKS RECEIVED

A SYNOPSIS OF HYGIENE. By W. Wilson Jameson and G. S. Parkinson. 5th ed. London: Churchill, 1936. 623 pp. Price, $6.75.

A LIBRARY HANDBOOK FOR SCHOOLS OF NURSING. Prepared by the Subcommittee on the Nursing School Library of the Curriculum Committee, National League of Nursing Education. New York: National League of Nursing Education, 1936. 264 pp. Price, $2.50.

EUGENICAL STERILIZATION. A REORIENTATION OF THE PROBLEM. By The Committee of the American Neurological Association for the Investigation of Eugenical Sterilization. New York: Macmillan, 1936. 211 pp. Price, $3.00.

PRACTICAL EXAMINATION OF PERSONALITY AND BEHAVIOR DISORDERS, ADULTS AND CHILDREN. By Kenneth E. Appel and Edward A. Strecker. New York: Macmillan, 1936. 214 pp. Price, $2.00.

KEEPING YOUR CHILD NORMAL. By Bernard Sachs. New York: Hoeber, 1936. 148 pp. Price, $1.50.

TO RAISE THESE HALT. By Fred Rothermell. New York: Lee Furman, 1936. 350 pp. Price, $2.50.

THE HAY SYSTEM OF CHILD DEVELOPMENT. By William Howard Hay and Esther L. Smith. New York: Crowell, 1936. 232 pp. Price, $2.00.

A TEXTBOOK OF BACTERIOLOGY AND ITS APPLICATIONS. By Curtis M. Hilliard. rev. ed. New York: Ginn, 1936. 339 pp. Price, $3.50.

CURRENT SOCIAL PROBLEMS. By William Withers, Agnes Snyder and Carlton Qualey. New York: Prentice-Hall, 1936. 302 pp. Price, $2.80.

NUTRITIVE AND THERAPEUTIC VALUES OF THE BANANA. A Digest of Scientific Literature. By Research Department, United Fruit Company, Boston, Mass., 1936.

MANUAL OF MODERN COOKERY. By Jessie Lindsay and V. H. Mottram. London:

University of London Press, 1930. 316 pp. Price, $1.35.

FEEDING, DIET AND THE GENERAL CARE OF CHILDREN. By Albert J. Bell. 3d ed. New York: Putnam, 1936. 316 pp. Price, $2.00.

PRESS TIME. A BOOK OF POST CLASSICS. *New York Evening Post.* New York: Books, Inc., 1936. 383 pp. Price, $2.00.

MEDICAL CLASSICS. Compiled by Emerson Crosby Kelly. Vol. I, No. 1, Sept., 1936. Baltimore: Williams & Wilkins. Subscription, $10.00 in United States. Foreign, $10.50.

THE LAST THIRTY YEARS IN PUBLIC HEALTH. By Sir Arthur Newsholme. London: Allen & Unwin, 1936. 410 pp. Price, $4.75.

SNOW ON CHOLERA. Reprint of Two Papers by John Snow. New York: Commonwealth, 1936. 191 pp. Price, $2.50.

HEALTH AND ENVIRONMENT. The Elements of Sanitary Science. By Jean Martin White, R.N. Philadelphia: Davis, 1936. 209 pp. Price, $2.50.

DIABETIC MANUAL—FOR PRACTITIONERS AND PATIENTS. By Edward L. Bortz, M.D. Philadelphia: Davis, 1936. 222 pp. Price, $2.00.

THE RIDDLE OF WOMAN. By Dr. Joseph Tenenbaum. New York: Furman, 1936. 477 pp. Price, $3.50.

ADVENTURES IN RECREATION. By Weaver Weddell Pangburn. New York: Barnes, 1936. 138 pp. Price, $.72.

HEALTH GUIDES AND GUARDS. By Francis P. Wall and Louis D. Zeidberg. New York: Prentice-Hall, 1936. 208 pp. Price, $1.35.

LABORATORY MANUAL FOR CHEMICAL AND BACTERIAL ANALYSIS OF WATER AND SEWAGE. 2d ed. By Frank R. Theroux, Edward F. Eldridge and W. LeRoy Mallmann. New York: McGraw-Hill, 1936. 228 pp. Price, $2.50.

FACING THE FUTURE WITH THE CHARACTER BUILDING AGENCIES. By Arthur A. Schuck. Prepared by National Character Building Agencies in coöperation with the 1936 Mobilization for Human Needs. Distributed by Community Chests and Councils, Inc., 155 East 44th St., New York, N. Y. 32 pp. Price, $.10.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

All about Hormones — Intended for the educated laity, this review of present knowledge of the functions of the ductless gland will enlighten all sanitarians, except the few who know about physiology.

COLLIP, J. B. Hormones. Sci. Month. Nov., 1936, p. 411.

Ascertaining Effectiveness of Disease Control Measures—Putting specific tuberculosis control methods to statistical tests is essential if a public health program is to be evolved which will be both flexible and efficient.

DOWNES, J. A Study of the Effectiveness of Certain Administrative Procedures in Tuberculosis Control. Milbank Mem. Quart. 14, 4:317 (Oct.), 1936.

Telling the Public—An excellent series of discussions for the lay public on diabetes, appendicitis, sight conservation, poliomyelitis, colds, sleep, quacks, medical problems, etc., conducted by the New York State Medical Society.

EPSTEIN, A. A. *et al.* What the Community Should Know about Diabetes, etc. New York State J. M. 36, 18:1322 (Sept. 15), 1936.

Water Analysis Discussed—As it is possible that typhoid bacilli may persist longer than organisms of the coli-aerogenes group in water treated with chlorine, the authors suggest the reconsideration of the significance of the latter organisms as a standard of safety.

HEATHMAN, L. S. *et al.* Resistance of Various Strains of E. Typhi and Coli-aerogenes to Chlorine and Chloramine. Pub. Health Rep. 51, 40:1367 (Oct. 2), 1936.

Our Knowledge of Poliomyelitis—Compared to other communicable diseases, polio is not an important cause of death. For the present, a successful vaccine is not available and chemical prophylaxis is decidedly in the experimental stage. About the only preventive measures for susceptible ages are: abstaining from unnecessary contacts during epidemics; guarding against excessive strain; reporting suspicious illnesses.

LEAKE, J. P. Poliomyelitis. J.A.M.A. 107, 14:1094 (Oct.), 1936.

Nutritive Values of Raw and Pasteurized Milk—Nutritionists will want to know about this study even though the results seem not of practical importance. Third generation rats fed pasteurized milk and wheat showed evidence of vitamin deficiency not found in rats fed raw milk and wheat.

MATTICK, E. C. V., and GOLDING, J. Relative Value of Raw and Heated Milk in Nutrition. Lancet 2, 12:702 (Sept. 19), 1936.

More Trichinosis Than You Suspect—Examination of muscle tissues taken from random autopsies in California (none of the patients ever having shown clinical signs of trichinosis) revealed a 24 per cent infection of Trichinella spiralis. The author reminds us that under present methods of meat inspection, the consumer must assume the responsibility for thorough cooking of all pork.

MCNAUGHT, J. B., and ANDERSON, E. V. The Incidence of Trichinosis in San Francisco. J.A.M.A. 107, 18:1446 (Oct. 31), 1936.

The Cinderella of Medicine—Cautioning health authorities not to neglect gonorrhea in their renewed drives for the control of syphilis, this author breaks down reported cases into age and sex groups which are significant guides to the application of preventive measures.

NELSON, N. A. Gonorrhea. Milbank Mem. Quart. 14, 4:328 (Oct.), 1936.

As Others See Us—Our hodgepodge of local health administrative units is observed by a British sanitarian. His findings prove a good antidote to any delusions of grandeur from which we may suffer.

PICKEN, R. M. F. Public Health in the United States of America. Brit. M. J., 3951: 631 (Sept. 26), 1936.

Vitamins and Infection—Dogs fed a diet deficient in vitamin B appeared to be more susceptible to artificial infection with *S. aureus* and lost twice as much weight after infection as did the control animals.

ROSE, S. B., and ROSE, W. B. Bacterial Resistance in Vitamin B Deficient Dogs. J. Infect. Dis. 59, 2:174 (Sept., Oct.), 1936.

What to Do About Heart Diseases—Half or more of all cardiac cases are among the elderly. What to do about the other cases caused by syphilis, rheumatic fever, etc., is discussed for the benefit of the public health nurse, but the paper has something in it for every health worker.

SAMPSON, J. J. Heart Disease as a Public Health Problem. Pub. Health Nurs. 28, 10:637 (Oct.), 1936.

International Vital Statistics—As a fairly reliable indication of the sanitary, medical, and social progress of a nation, this author presents an interesting study of the "natural" deaths compared to the total deaths in a number of countries. The United States enjoys a favorable position.

SAND, R. Changes in the Death Rate Since the Seventeenth Century. Milbank Mem. Quart. 14, 4:311 (Oct.), 1936.

ASSOCIATION NEWS

THOMAS PARRAN, M.D., PRESIDENT
ARTHUR T. McCORMACK, M.D., PRESIDENT-ELECT

AT the Sixty-fifth Annual Meeting of the American Public Health Association in New Orleans, November 20–23 Walter H. Brown, M.D., of Stanford University, Palo Alto, Calif., retired from the office of President, and Thomas Parran, M.D., Surgeon General of the U. S. Public Health Service, became President for the year 1936–1937. The new President-Elect is Arthur T. McCormack, D.Sc., LL.D., M.D., D.P.H., State Health Commissioner of Kentucky.

Arthur T. McCormack was born in Nelson County, Ky., August 21, 1872, the son of Dr. Joseph Nathaniel McCormack and Corrine Crenshaw. In 1893 he entered the College of Physicians and Surgeons, Columbia University, New York, from which he received the degree of M.D. in 1896. Detroit College of Medicine and Surgery made him a D.P.H. in 1925; Berea College gave him a D.Sc. in 1926; Transylvania College conferred an LL.D. in 1930.

He began practice at Bowling Green, Ky., in 1897, and was shortly thereafter appointed Health Officer of Warren County. From 1898 to 1912 he served as Assistant State Health Officer of Kentucky. Since 1912 he has been continuously State Health Officer or State Health Commissioner and Secretary of the State Board of Health.

He was Surgeon General, Kentucky National Guard, 1900–1908; Lieutenant, Medical Reserve Corps, U.S.A., 1911–1917; promoted to Major upon the entrance of the United States in the World War in 1917, and organized

Dr. Arthur T. McCormack

Base Hospital Number 59. When about ready to proceed overseas, he was ordered to Panama as Chief Medical Officer of the Canal Zone with the grade of Lieutenant Colonel. He completed construction of the Ancon Hospital and controlled an epidemic of cerebrospinal meningitis on the Japanese S. S. Anyo Maru, for which he received the personal thanks of the Mikado.

In 1901 he founded the *Kentucky Medical Journal,* of which he has since been editor and a director. He organized and served as Dean of the School of Public Health, University of Louisville; Secretary of the Kentucky State Medical Association for the past 26 years; is a member of the Gorgas Memorial Institute; member of the National Health Council; Fellow of the American College of Surgeons; member and officer of the American, Kentucky, and Jefferson County Medical Associations; Past-President and Secretary of the Medical Veterans of the World War; Past-President of the Conference of State and Provincial Health Authorities of North America; Past-President of the Kentucky Conference of Social Work; and is now Chairman of the Kentucky Social Security Commission.

Originating the idea of administering public health in rural communities through local full-time health departments, with the county as a unit and operating under the supervision of a central authority, Dr. J. N. McCormack, his father, did the pioneer work in promotion of this idea and lived to see several full-time county health units successfully functioning in his state.

Dr. Arthur T. McCormack has carried the work forward so well that today not only three-fourths of the total population of Kentucky have whole-time public health administration, but fully one-fourth of the people in rural communities in the United States and a large proportion of those in Canada are enjoying health protection furnished by local full-time health departments patterned after the Kentucky model.

Dr. McCormack has been a member of the A.P.H.A. since 1919, was made a Charter Fellow in 1923, and is a Life Member.

DR. CUMMING ELECTED AN HONORARY FELLOW

DR. HUGH S. CUMMING, the former Surgeon General, was made an Honorary Fellow of the American Public Health Association at the recent New Orleans Annual Meeting. Dr. Cumming's accomplishments in the public health field are so outstanding and so numerous that this is an honor he richly deserves.

TRIBUTE TO MEMBERS OF LONG STANDING

THE presentation of a beautiful certificate to each member who has been affiliated with the American Public Health Association for 40 years or more was an interesting and touching ceremony at the banquet at the New Orleans Annual Meeting. Two of the eight members concerned, namely Dr. John Harvey Kellogg and Daniel W. Mead, were there in person. The certificates for the remaining members who were not able to attend were received as follows: Dr. Mazÿck P. Ravenel for Dr. William C. Woodward; Dr. Henry D. Chadwick for Mr. Robert Spurr Weston; Dr. Henry F. Vaughan for Dr. George A. Soper; Dr. Angel de la Garza Brito for Dr. Jesus E. Monjaras; Dr. Clarence L. Scamman for Dr. Charles V. Chapin; and Dr. Carl E. Buck for Marion Talbot.

PUBLIC HEALTH ASSOCIATION OF NEW YORK CITY—NEW AFFILIATED SOCIETY

THE request of the newly formed Public Health Association of New York City for affiliation with the American Public Health Association was accepted at the New Orleans

Annual Meeting. The officers are: *President,* Dr. Donald B. Armstrong; *First Vice-President,* Dr. John L. Rice; *Second Vice-President,* Hazel Corbin; *Secretary-Treasurer,* Frank Kiernan.

The first scientific meeting of this new affiliated society will be held on December 3, 1936, at the George Washington Hotel. The society is made up of those Fellows and Members of the American Public Health Association living in Metropolitan New York City who expressed their desire to become affiliated. At the present time the membership numbers about 300.

DEATH OF ROSS L. LAYBOURN

OUR meeting in New Orleans was marred by one very sad incident. On Monday morning, October 19, Ross L. Laybourn, the Director of the Bacteriological Laboratory of the State Board of Health of Kansas, experienced a heart attack while on his way to breakfast. He soon regained consciousness, was removed to the nearest hospital, and later to a government hospital, since he was a reserve officer in the Army. He died November 10.

Mr. Laybourn was an exceedingly active member of our Laboratory Section. We carried a paper by him, which was to have been read at the New Orleans meeting, in the October *Journal,* it having been requested in advance. He became a member of our Association in 1918 and a Fellow in 1923. He will be greatly missed by his associates of the Laboratory Section and members of our Association in general.

FREE HEALTH SURVEY

A FREE health survey will be granted to some one county or district, and some one city, entered and submitting a schedule in the 1936 Inter-Chamber Rural Health Conservation Contest.

Basis Upon Which Survey Will Be Granted—In order to be eligible for the Free Survey, a county or district, or a city, must submit a fact-finding schedule. The free survey will be granted not upon the score attained in the 1936 Contest but rather upon a combination of the following two factors: (1) The need of the community for a health survey, and (2) the opportunity and likelihood of the community making effective use of such a survey.

For further information write either the Insurance Department, Chamber of Commerce of the United States, Washington, D. C., or the Committee on Administrative Practice of the American Public Health Association.

SCIENTIFIC EXHIBITS AT NEW ORLEANS 1936

ALTHOUGH citations of merit were made for selected scientific exhibits at the Milwaukee meeting in 1935, this year at the New Orleans meeting certificates were conferred for the first time. Four exhibits were chosen by the judges for the award. Judges were: Dr. Guy S. Millberry, Dr. John L. Rice, and Dr. G. Foard McGinnes. The Committee on Scientific Exhibits has already expressed, publicly, its appreciation to the judges for their services in the difficult task with which they were charged. Their decisions were unanimous. To aid them the committee suggested 4 criteria for their guidance.

1. The effectiveness of the exhibit in *attracting attention.*
2. Its effectiveness in *holding attention* long enough to accomplish its purpose.
3. Its *clarity* in expressing its message.
4. Is the message worth while or *pertinent* for presentation to a group of *public health workers?*

In addition the judges were asked to make a brief statement to indicate why

each exhibit was selected. Their selections and statements were:

1. *The American Red Cross* exhibit on Pellagra, because it is wisely confined to a single subject and most attractively presented.
2. *National Society for the Prevention of Blindness,* for the concise, clear, and inexpensive presentation of its important motif.
3. *Sewerage and Water Board of New Orleans,* for a beautifully prepared representation of a local health facility.
4. *The Committee on Administrative Practice exhibit on Health Conservation Contests,* which, clearly expressing its purpose in cleverly worded legends, is limited to one subject eminently appropriate to the occasion.

A number of other exhibits received comment from the judges for particularly interesting items.

It was noteworthy that some exhibits were not entirely appropriate to a public health meeting, or which violated many of the accepted principles of a good exhibit, nevertheless attracted considerable attention from the delegates.

Also, it was specially gratifying to observe the large number of exhibits entered. The hearty thanks of the Association are due all exhibitors for their expenditures of time and effort toward making so creditable a contribution to the annual meeting.

BACK NUMBERS OF JOURNAL NEEDED

DUE to unusual demands for the following numbers of the *American Journal of Public Health*—

June,	1935
November,	1935
February,	1936

—the Executive Office of the A.P.H.A. has run out of stock on these issues and is in need of as many copies as are obtainable. It will be greatly appreciated if members who can spare these *Journals* will send them to headquarters.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

John A. Carter, M.D., 1301 Washtenaw Ave., Ann Arbor, Mich., Administrator, Clermont County Health Unit (taking course at University of Michigan)

Jose B. Castellanos, Valladolid 55 Bis., Mexico, D. F., Mex., State Health Officer, Veracruz

Julio Cesar Trevino, M.D., Ave. Hidalgo #41, Mexico, D. F., Mex., Chief, Quarantine Central Office, Department of Health

Sambola J. Couvillon, M.D., Moreauville, La., Member, State Board of Health

Walter M. Dickie, M.D., Ph.D., 8 Roble Court, Berkeley, Calif., State Director of Public Health

Thomas M. Fly, M.D., City Hall, Little Rock, Ark., City Health Officer

Alton A. Jenkins, M.D., 4371 Everett St., Oakland, Calif., District Health Officer, Utah (Post Graduate Student in Public Health, University of California)

Abraham I. Love, M.D., 4500 Elston Ave., Chicago, Ill., Health Officer, City Board of Health

Loran E. Orr, M.D., 1402 Washington Heights, Ann Arbor, Mich., District Health Superintendent, Illinois State Dept. of Public Health (taking public health course at University of Michigan)

Carl V. Reynolds, M.D., State Board of Health, Raleigh, N. C., State Health Officer

J. R. Ridlon, M.D., U. S. Marine Hospital, Galveston, Tex., Medical Officer in Charge

Gradie R. Rowntree, M.D., C.P.H., Hickman, Ky., Fulton County Health Officer

Emil A. Steiner, M.D., Somerset, Ky., Director, Pulaski County Health Dept.

J. Leland Tanner, M.D., M.P.H., Henderson, Ky., Director, Henderson County Health Dept.

Paul M. Thompson, M.D., Abbeville, Ala., Henry County Health Officer

Edward L. Van Aelstyn, M.D., 2331 Prince St., Berkeley, Calif., District Health Officer,

Utah (taking public health course at the University of California)

John W. Williams, M.D., C.P.H., City Hall, Asheville, N. C., City Health Officer

Benjamin F. Wyman, M.D., State Office Bldg., Columbia, S. C., Director, Rural Sanitation and County Health Work, State Board of Health

Laboratory Section

John X. Blender, 817 Arch St., Ann Arbor, Mich., Graduate Student, University of Michigan

Mattie Carter, State Hygienic Laboratory, Jackson, Miss., First Assistant Bacteriologist

William W. Cort, Ph.D., 615 N. Wolfe St., Baltimore, Md., Professor of Helminthology, School of Hygiene and Public Health

Mildred Davis, State Board of Health, Jackson, Miss., Bacteriologist, State Hygienic Laboratory

John M. Liptay, 37 Northern Blvd., Long Island City, N. Y., President, Laboratory Furniture Co., Inc.

Orin A. Ogilvie, M.D., 916 Military Drive, Salt Lake City, Utah, Teacher of Bacteriology, Pathology and Immunology, University of Utah

John P. Ransom, 608 Howard St., San Luis Obispo, Calif., Bacteriologist, San Luis Obispo County Health Dept.

Morris Ribner, 421 Flatbush Ave., Brooklyn, N. Y., Bacteriologist, Mt. Prospect Laboratory

Burton T. Simpson, M.D., 113 High, Buffalo, N. Y., Director, Division of Cancer Control, State Dept. of Health

George T. Stevens, U. S. Marine Hospital, San Francisco, Calif., Bacteriologist

Vital Statistics Section

Marjorie W. Amerine, 205 Lasseter St., Montgomery, Ala., Chief Tabulating Clerk, State Board of Health

Clifford H. Greve, 320 S. 7th St., Ann Arbor, Mich., Student

Public Health Engineering Section

Walter D. Bellamy, P. O. Box 301, Huntsville, Tex., District Sanitary Engineer, State Dept. of Health

Andrew T. Dempster, 9355 Wildemere Ave., Detroit, Mich., Assistant Sanitary Engineer, Dept. of Health

Wesley E. Gilbertson, State Dept. of Health, Bismarck, N. D., District Supervisor, Community Sanitation

Wilbert H. Grisham, Rm 105, Court House, Memphis, Tenn., Director, Division of Malaria-Mosquito Control, City Health Dept.

Albert Haneman, Jr., Box 476, Victoria, Tex., District Sanitary Engineer, State Dept. of Health

Chauncey A. Hyatt, Capitol Bldg., Springfield, Ill., Swimming Pool Sanitarian, State Dept. of Public Health

Paul F. Krueger, 707 City Hall, Chicago, Ill., Director, City Division, Bureau of Dairy Products, Board of Health

Harold Lesser, 118 N. Ingalls St., Ann Arbor, Mich., Student

Douglas L. Parker, 161 College St., Wilmington, O., Sanitarian, Clinton County

John B. Thomas, 1601 Ridge Rd., Catonsville, Md., Sanitary Engineer, Land Utilization Division, Resettlement Administration

William H. Weir, State Capitol Bldg., Atlanta, Ga., Assistant Chief, Division of Sanitary Engineering, State Dept. of Public Health

Cranston J. Wilcox, 223 S. State, Ann Arbor, Mich., Student

Industrial Hygiene Section

Theodore F. Hatch, 80 Centre St., New York, N. Y., Associate Dust Control Engineer, Division of Industrial Hygiene, State Dept. of Labor

Siegfried J. Nilson, M.D., D.D.S., 80 Maiden Lane, New York, N. Y., Medical Director, Fidelity and Casualty Co.

Oliver W. Welch, M.D., M.P.H., Tennessee Valley Authority, Wilson Dam, Ala., Associate Medical Officer, Industrial Hygiene

Food and Nutrition Section

Howell A. Smith, 800 West 21 St., Austin, Tex., Field Milk Supervisor, State Dept. of Health

Arthur H. Williamson, D.V.M., State Board of Health, Jacksonville, Fla., State Dairy Supervisor

Child Hygiene Section

Mildred A. Hesser, 117 N. State St., Ann Arbor, Mich., Student

Geneva S. Rothemund, M.D., 514 S. Wittenberg Ave., Springfield, O., Pediatrician, Bureau of Child Hygiene, State Dept. of Health

Lewis K. Sweet, M.D., Box 417, Tahlequah, Okla., Medical Officer, U. S. Children's Bureau

Virginia E. Webb, M.D., 313 New Court House, New Orleans, La., Acting Director, Red River Parish Health Administration

E. Bryant Woods, M.D., State Board of Health, Jacksonville, Fla., Director, Maternal and Child Health Bureau

Public Health Education Section

Etta G. Davis, R.N., C.P.H., 11321 Strathmoor, Detroit, Mich., Nurse Counsellor, Dept. of Health

James E. McCormick, M.D., 322 Clinton Ave., Newark, N. J., Assistant Director, Health Education

Leo H. Mynes, M.D., R.F.D. #3, Box 15, Charleston, W. Va., Medical Director, School Health Service, Kanawha County Schools

Public Health Nursing Section

Pauline Baker, 540 Packard St., Ann Arbor, Mich., Public Health Nurse, Madison County Board of Health (taking course at University of Michigan)

Agnes B. Bowe, 7556 Byron Place, Clayton, Mo., Director, Public Health Nursing Service, St. Louis County Health Dept.

Elsie M. Bowman, 1208 E. University, Ann. Arbor, Mich., Student Nurse

Florence H. Bunton, 6133 Fischer Ave., Detroit, Mich., Supervisor and Coördinator, Generalized Nursing Districts, Dept. of Health

Mildred Cardwell, R.D. #3 Lansing, Mich., Nurse, Ingham County Public Health Nursing Service

Georgie C. Clark, R.N., 416 Avon St., Flint, Mich., School Nurse, Board of Education

Jane D. Gavin, Court House, Durham, N. C., Supervising Nurse, Durham City and County Health Dept.

Hazel C. Holmes, R.N., 408 S. 4th Ave., Ann Arbor, Mich., Public Health Nurse (Student)

Helen F. Kramer, R.N., 755 E. University Ave., Ann Arbor, Mich., Public Health Nurse (Student)

Gladys F. Morehouse, 12703 Northlawn, Detroit, Mich., Special Supervisor, School Nurses

Matie V. Neely, R.N., 2614 West 15, Little Rock, Ark., Assistant State Nursing Supervisor, State Board of Health

Eva Pugh, R.N., P. O. Box 456, Danville, Va., Tuberculosis Field Nurse, State Board of Health

Elizabeth N. Rowland, 540 Packard St., Ann Arbor, Mich., Public Health Nurse, Washington Court House Board of Health (taking public health course at University of Michigan)

Margaret S. Vaughan, State Capitol, Little Rock, Ark., Supervisor, Public Health Nursing, State Board of Health

C. A. Wagner, El Paso Masonic Hospital, El Paso, Tex., Superintendent

Anastasia Wilson, R.N., 108 S. Broadway, Buhl, Idaho, School and County Nurse, Twin Falls County Health Unit

Bertha M. Winne, R.N., 517 E. Main, Marion, Va., Field Nurse, State Dept. of Health

Erma L. Wolfort, R.N., 6145 McPherson, St. Louis, Mo., County Health Counselor, St. Louis County Health Dept.

Epidemiology Section

James C. Boland, M.D., 228 Eighth St., Troy, N. Y., Epidemiologist-in-training, State Dept. of Health

James R. Enright, M.D., 409 Olohana St., Honolulu, T.H., Director, Bureau of Communicable Diseases, Board of Health

Ralph H. Heeren, M.D., Ph.D., 275 Medical Lab. Bldg., Iowa City, Ia., Assistant Professor of Hygiene and Preventive Medicine, University of Iowa Medical College

Ralph B. Snavely, M.D., Office of Indian Affairs, Dept. of the Interior, Washington, D. C., Commissioned Medical Officer, U. S. Public Health Service

Morris A. Stewart, Ph.D., University of California, Davis, Calif., Assistant Professor of Entomology

Glenn S. Usher, M.D., 1208 Tenth Ave. W., Seattle, Wash., Assistant Epidemiologist, State Dept. of Health

Unaffiliated

Ben A. Cohan, 1032 Church St., Ann Arbor, Mich., Student

Rufus Cole, M.D., D.Sc., 66 St. & York Ave., New York, N. Y., Member, Board of Scientific Directors, International Health Division, Roekefeller Foundation

Delia A. Lynch, M.D., 712 World Herold Bldg., Omaha, Nebr.

Edwin M. Mahoney, M.D., 630 Dwight St., Holyoke, Mass., Member, Board of Health

Dr. Felipe Malo Juvera, Alzate 83, Mexico, D. F., Mex., Chief of a Sanitary Brigade, Public Health Dept.

Clifton E. Merritt, M.D., 813 McKinley, Ann Arbor, Mich., Student

William B. Perry, Jr., M.D., 55 Shattuck St., Boston, Mass., Student

Edwin H. Place, M.D., 1608 Geddes, Ann Arbor, Mich., Student

Hanley E. Rosenberg, 1026 Vaughan, Ann Arbor, Mich., Student

Fannie B. Shaw, 50 W. 50 St., New York, N. Y., Secretary, School Health Association, National Tuberculosis Assn.

Milton L. Shurr, 1412 Geddes, Ann Arbor, Mich., Student

Vesta L. Stone, R.N., 12 Grove St., Fitchburg, Mass., Executive Secretary, N. Worcester County Public Health Assn.

Lars W. Switzer, M.D., Spruce St., Manistee, Mich.

Beatrice E. Tucker, 9 S. Michigan Ave., Chicago, Ill., Medical Director, Chicago Maternity Center

Echo D. Watson, Rm 230, State Bldg., Boise, Idaho, Secretary to Director of Public Health

DECEASED MEMBERS

Professor Edwin O. Jordan, Chicago, Ill., Elected Member 1899, Fellow 1922

Dr. Frank G. Atwood, New Haven, Conn., Elected Member 1920

Gordon Hastings, M.D., M.P.H., Little Rock, Ark., Elected Member 1934

Nicholas S. Hill, Jr., New York, N. Y., Elected Member 1910, Fellow 1922

J. C. Perry, M.D., San Francisco, Calif., Elected Member 1915, Fellow 1923

James M. Anders, Philadelphia, Pa., Elected Member 1933

Richard O. Beard, M.D., Minneapolis, Minn., Elected Member 1926

SOME OF THE PAPERS TO APPEAR IN THE JANUARY JOURNAL

The Efficiency of State and Local Laboratories in the Performance of Serodiagnostic Tests for Syphilis
Parran, Hazen, Sanford, Senear, Simpson, Vonderlehr

Newer Epidemiology of Yellow Fever
Soper

Public Health Features in Milk Plant Layout
Irwin

Recent Trends in Engineering Practice
Wolman

Housing as a Public Health Problem
Winslow

The Rôle of Vital Statistics in Medical Science
Walker

NEWS FROM THE FIELD

SOCIAL HYGIENE DAY

THE first National Social Hygiene Day will be held February 3, 1937, as announced by the American Social Hygiene Association, New York. On this day, state and community voluntary organizations interested in the control of syphilis and gonorrhea, and in other social hygiene problems, with the advice and approval of health authorities and the medical and allied professions, plan to hold meetings all over the United States.

The American Social Hygiene Association will hold its annual meeting on February 3 and the Social Hygiene Council of Greater New York will hold its Fifth Annual Regional Conference. It is expected that public leaders, including Surgeon General Parran, President Ray Lyman Wilbur, of Stanford University, President of the American Social Hygiene Association and former Secretary of the Interior, will speak at these meetings. National agencies and many of their state and community organizations which include social hygiene activities in their yearly programs are planning to participate. It is probable that a nation-wide radio hook-up will provide addresses of importance from government officials and civic leaders in different parts of the country as a climax to the activities of the First National Social Hygiene Day.

There has been definite progress all along the line during the past year in public understanding and support of the campaign against syphilis. Newspapers and magazines are opening their columns to public discussion of this health menace to a greater extent than ever before.

It is believed that the direction of united nation-wide attention to this subject in the way that is proposed will help professional and lay community leaders to capitalize and increase this new interest, and consolidate for further advances toward meeting Dr. Parran's challenge to " stamp out syphilis."

FLORIDA TUBERCULOSIS BUREAU

THE Florida State Department of Health has established a Tuberculosis Bureau, with Dr. Arthur J. Logie, of Chattahoochee, as Director. One of the first activities of the Bureau will be a survey to determine the need for clinics throughout the counties.

A mobile laboratory will be operated in sections not cared for by county health units.

KANSAS VENEREAL DISEASE COMMITTEE

THE Kansas Medical Society will appoint a committee on venereal diseases to act in an advisory capacity to the State Board of Health in the development and execution of programs throughout Kansas.

This action followed a conference between representatives of the State Board of Health and the state medical society.

MICHIGAN BUREAU OF INDUSTRIAL HYGIENE

A BUREAU of Industrial Hygiene has been created in the Michigan Department of Health, with John M. Hepler, C.E.,† of Lansing, Mich., as Director.

A preliminary survey of plant conditions to determine the scope of existing industrial hazards, the location of

† Member A.P.H.A.

potential hazards, and to evaluate the need for preventive measures is being undertaken by the Bureau. One phase of the program will be the collection and analysis of case records of industrial diseases.

PERSONALS

ELDRED K. MUSSON, M.D.,* of Jefferson City, Mo., has resigned as Director of the division of communicable disease control of the Missouri State Department of Health. He will be appointed to a similar position with the Kansas Board of Health.

HARRY E. JORDAN,* of Indianapolis, Ind., assumes his duties as Executive Secretary of the American Water Works Association on Dec. 1. Mr. Jordan has been identified for many years with the Indianapolis Water Company. He is succeeded by Cecil K. Calvert, B.S.,† of Indianapolis.

DR. NORRIS T. OWEN, of Rapid City, S. Dak., was recently named President of the South Dakota State Board of Health. Dr. Carl A. Feige, of Canova, is Vice-President, and Dr. Burt A. Dyar,† of Pierce, is Director of Medical Licensure. Dr. Park B. Jenkins † is Secretary.

EMIL A. STEINER, M.D.,† of Cleveland, Ohio, has been appointed Health Officer of Pulaski County, with offices in Somerset, Ky.

JULIAN O. LONG, M.D.,† of Baltimore, Md., has been provisionally appointed to succeed Dr. James R. Scott * as Health Officer of the Third District of Albuquerque, N. M., resigned.

EDGAR MAYER, M.D.,† and James Burns Amberson, Jr., M.D., have been appointed by the State Industrial Commissioner of New York as Consultants on Dust Diseases.

* Fellow A.P.H.A.
† Member A.P.H.A.

DR. JACK B. PORTERFIELD, Christiansburgh, Va., has been appointed Health Officer of the peninsula district, to succeed Dr. George E. Waters, Williamsburgh, resigned. Dr. Sheldon D. Carey, recently of Abingdon, Va., has been named to succeed Dr. Porterfield as Health Officer of Montgomery County.

DR. WILDER G. PENFIELD, Professor of Neurology and Neurological Surgery, McGill University Faculty of Medicine, Montreal, delivered the first Harvey Lecture of the season on October 15 at the New York Academy of Medicine.

DR. GEORGE K. PRATT, since 1930 Medical Director of the Mental Hygiene Committee of the New York State Charities Aid Association, has been appointed to a similar position with the Connecticut Society for Mental Hygiene. He succeeds Dr. Edgar Van Norman Emery, who has been appointed Professor of Social Psychiatry at Washington University School of Medicine, St. Louis, Mo.

LLOYD B. SHEFFIELD, M.D.,† has been appointed Health Director of the Dallas public school system, succeeding Edythe P. Hershey, M.D.,† of Austin, resigned. Dr. Sheffield has been Assistant Health Director for 5 years.

DR. HAROLD DOUGLAS SINGER, Head of the Department of Psychiatry, University of Illinois College of Medicine, has been put in charge of work to promote undergraduate instruction in psychiatry in the university. The Rockefeller Foundation has granted the university a fund of $15,000 a year for 3 years for this purpose.

DR. JESSE M. DISHMAN, Greensburg, Ky., Health Officer of Green County, has been appointed Health Officer of Caldwell County, to succeed Dr. B. Kirtley Amos, resigned.

LORENZO L. PARKS, M.D.,† Health Officer of Tarboro, N. C., has been appointed Secretary of the Health Conservation Committee which has been organized in Edgecombe County.

J. CLARENCE FUNK, A.B., Sc.D., LL.B.,* formerly of the Pennsylvania State Department of Health, Harrisburg, and more recently with the U. S. Public Health Service, Washington, D. C., has been placed in charge of the educational work of the Virginia State Department of Health.

ALFRED D. GREGG, M.D.,† of Liberty, N. C., has been appointed Health Officer of Vance County, succeeding Zack P. Mitchell, M.D.,† of Henderson, who has been appointed Health Officer of Swain and Graham Counties.

DR. ROBERT M. TAYLOR has been appointed Health Officer of East Haven, Conn., succeeding Paul H. Brown, M.D.†

GARNER M. BYINGTON, M.D.,† of Battle Creek, Mich., for 4 years Medical Director of the W. K. Kellogg Foundation, has resigned to become Director of Medical Relations in the Detroit Department of Health. Dr. Byington will have supervision of the program which attempts to link up the practicing physician with all phases of preventive medicine. He will also supervise the program for medical education.

ABRAM L. VAN HORN, M.D.,† Chief of the Bureau of Child Hygiene of the Ohio State Department of Health since 1934, has been appointed a regional consultant for the Children's Bureau, U. S. Department of Labor. Dr. Van Horn will supervise the maternal and child health program of the Bureau in Maryland, Delaware, District of Columbia, Virginia, North and South Carolina, Georgia, and Florida.

JOHN M. HEPLER, C.E.,† of Lansing, Mich., is the Director of the newly created Bureau of Industrial Hygiene of the Michigan Department of Health.

DR. GORDON E. SAVAGE,† of Osborn, Ohio, has been appointed Health Officer of Greene County. The position has been heretofore half time.

DR. REXFORD A. BURDETTE, of Charleston, W. Va., has been named Director of the Monongalia County Health Department, succeeding Robert C. Farrier, M.D.,† who recently resigned to accept a similar position in Delta County, Mich.

DR. KURT C. BECKER, of Toledo, Ohio, has been appointed District Health Officer, with offices at Royal Oak, Mich., succeeding Charles H. P. G. Benning, M.D., C.P.H.,* who has become Director of Health of Schools of Peoria, Ill.

DR. GEORGE E. COGAN has been elected President of the Hartford Board of Health, succeeding Dr. Robert V. Boyce, resigned.

DR. JAMES W. MILLER, recently Health Officer of Gallatin County, Ky., has been transferred to Green County, to succeed Dr. Jesse M. Dishman, of Greensburg, recently appointed in Caldwell County.

DR. JAMES O. NALL, recently of Murray, Ky., has been appointed Health Officer of Trigg County.

DR. PAUL C. BRATTEN, of New Bremen, Ohio, has been appointed Health Officer of Shelby County, to succeed the late Alfred B. Lippert, of Sidney.

DR. ROBERT J. ROWE, of Kaufman, Tex., has been appointed a member of the State Board of Health of Texas, to succeed Dr. George W. Cox, of Del Rio, resigned.

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* Fellow A.P.H.A.
† Member A.P.H.A.

A. ELIZABETH INGRAHAM,* M.D., since 1923 Director of the Bureau of Child Hygiene of the Connecticut State Department of Health, Hartford, Conn., has resigned, effective January 1.

EVA MOORE ADAMS,† of Jackson, Miss., has been appointed Supervisor of Health Education, a newly created position in the Mississippi State Board of Health.

DR. I. HOPE ALEXANDER was appointed director of the Department of Public Health, Pittsburgh, Pa., on November 14, succeeding Ray P. Moyer, M.D.†

DR. ERNEST L. GATES, Greenville, Ky., has been appointed a member of the State Board of Health.

DR. DAVID L. WILLIAMS, of Bedford, Mass., has been appointed State Commissioner of Mental Diseases, to succeed Dr. Winfred Overholser.

DR. OSCAR D. GARVIN, JR., of Ridge Springs, S. C., has been appointed Health Director of the district including the counties of McCormick, Edgefield, and Saluda.

DR. JAMES A. STUMBO, of Charleston, S. C., has been appointed Health Officer of a new health unit in Union County.

DR. HAROLD T. OESAU has been named Acting Health Officer of Stratford, Conn., succeeding the late Dr. DeRuyter Howland.

DR. FRANK M. DUNN, of New London, Conn., has been appointed Health Officer of Waterford, to succeed the late Dr. Ross E. Black.

DR. BRYAN J. CARDER, Deputy Health Commissioner of Berwyn township for the past 3 years, has been appointed Commissioner to fill the unexpired term of the late Edward J. Farrell, M.D.† of Berwyn, Ill.

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* Fellow A.P.H.A.
† Member A.P.H.A.

DEATHS

WILLIAM BUCHANAN WHERRY, M.D.,† of Cincinnati, Ohio, died November 1, at the age of 61.

THOMAS F. O'BRIEN, M.D.,† formerly Acting Health Officer of Hartford, Conn., died November 30, at the age of 52.

WILLARD P. GREENE, M.D.,* of Minneapolis, died November 25. He was Senior Epidemiologist in the Division of Preventable Diseases, Minnesota State Department of Health.

C. DUNCAN, M.D.,* of Concord, N. H., State Health Officer of New Hampshire, died November 12.

CONFERENCES AND DATES

American Association for the Advancement of Science. Atlantic City, N. J. Dec. 28–Jan. 1.

American Association of School Physicians—Regional Meeting with the Second National Conference on College Hygiene. Wardman Park Hotel, Washington, D. C. Dec. 28–31.

American Society of Heating and Ventilating Engineers, 43rd Annual Meeting. Hotel Statler, St. Louis, Mo. Jan. 25–27.

American Society of Parasitologists. Atlantic City, N. J. Dec. 29–31.

Association of Dairy, Food and Drug Officials of the United States. Miami Biltmore Hotel, Coral Gables, Fla. Dec. 7–10.

Connecticut Public Health Association. Waterbury, Conn. Dec. 16.

Educational Broadcasting, First National Conference — under auspices of the U. S. Office of Education and Federal Communications Commission. Mayflower Hotel, Washington, D. C. Dec. 10–12.

Florida Public Health Association. Tampa, Fla. Dec. 7–9.

Illinois Health Officers and Public

Health Nurses. Auditorium, Springfield, Ill. Dec. 8–9.
Massachusetts Public Health Association. Boston, Mass. Jan. 28.
National Conference on College Hygiene. Wardman Park Hotel, Washington, D. C. Dec. 28–31.
National Society for the Prevention of Blindness. Columbus, Ohio. Dec. 3–5.
New Jersey Conference of Social Work. Asbury Park, N. J. Dec. 3–5.
Public Health Association of New York City. First Scientific Meeting. George Washington Hotel, New York, N. Y. Dec. 3.
Society of American Bacteriologists. Indianapolis, Ind. Dec. 28–30.

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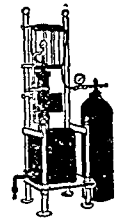
4. Social Worker (Medical). Entrance Salary $2,100 and maintenance.

Complete information regarding duties and requirements and application blanks may be obtained from the Division of Civil Service, Rooms 145–152, State House, Boston, Mass. Last date for filing applications Saturday, December 26 at 12:00 noon.



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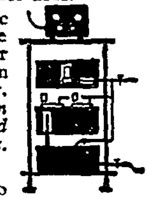

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INDEX

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INDEX

A

B

C

E

F

G

H

M

N

O

T

Page

W

Y

CANNED FOODS AND THE PUBLIC HEALTH

III. Chemical Preservatives

• Some of our readers have inquired as to whether or not chemical preservatives are used in commercially canned foods. In certain instances, this question was inspired by the fact that "canning compounds" were formerly sold for use in home canning and preserving operations. Such compounds, however, are rarely used by the housewife of today, and never by commercial canners.

We wish to state here that *no preservatives are used in commercially canned foods.*

Spoilage of food is principally caused by the growth and multiplication in food of microorganisms such as yeasts, molds, or certain types of bacteria. These microorganisms depend upon the food they inhabit for their nutrition and their life processes produce changes in the chemical or physical characteristics of food, or both. These changes lead us to state that the food has "spoiled."

Like other living organisms, these spoilage microorganisms can grow and multiply in a food only as long as conditions remain favorable for their existence. If any environmental factor, such as temperature, moisture or acidity, becomes unfavorable, these spoilage organisms are destroyed, or their development is inhibited.

All methods of food preservation have a common underlying principle; they all alter some factor or factors in the food environment so as to render conditions unfavorable for the growth or development of spoilage organisms in the food.

Thus, foods may be preserved by freezing or refrigeration. which serves to lower the temperature below that optimum for growth of certain spoilage organisms; dried foods keep because the moisture content has been reduced to an unfavorably low level; certain fermented foods keep because of the development of high acidity. All of these methods produce changes in the environment in which the food spoilage organisms must live.

Commercial canning is a method of food preservation in which the temperature factor in the environment is raised to a level above that optimum for growth of spoilage microorganisms. Thus, canned foods keep because in their preparation they are subjected to heat processes in hermetically sealed containers. The thermal processes raise the temperature of the foods to those temperatures at which the most resistant spoilage organisms present cannot grow or survive. (1)

The hermetic seal insures protection against future infection of the food by such organisms.

Thus, commercial canning is a method of food preservation which has for its basis the thermal destruction of spoilage organisms; no chemical preservatives are needed to insure preservation of the foods, and, consequently, none are used.

AMERICAN CAN COMPANY

230 Park Avenue, New York City

(1) The Microbiology of Foods, F. W. Tanner, Twin City Pub. Co., Champaign, Ill., 1932

This is the eleventh in a series of monthly articles, which will summarize, for your convenience, the conclusions about canned foods which authorities in nutritional research have reached. We want to make this series valuable to you, and so we ask your help. Will you tell us on a post card addressed to the American Can Company, New York, N. Y., what phases of canned foods knowledge are of greatest interest to you? Your suggestions will determine the subject matter of future articles.

The Seal of Acceptance denotes that the statements in this advertisement are acceptable to the Committee on Foods of the American Medical Association.